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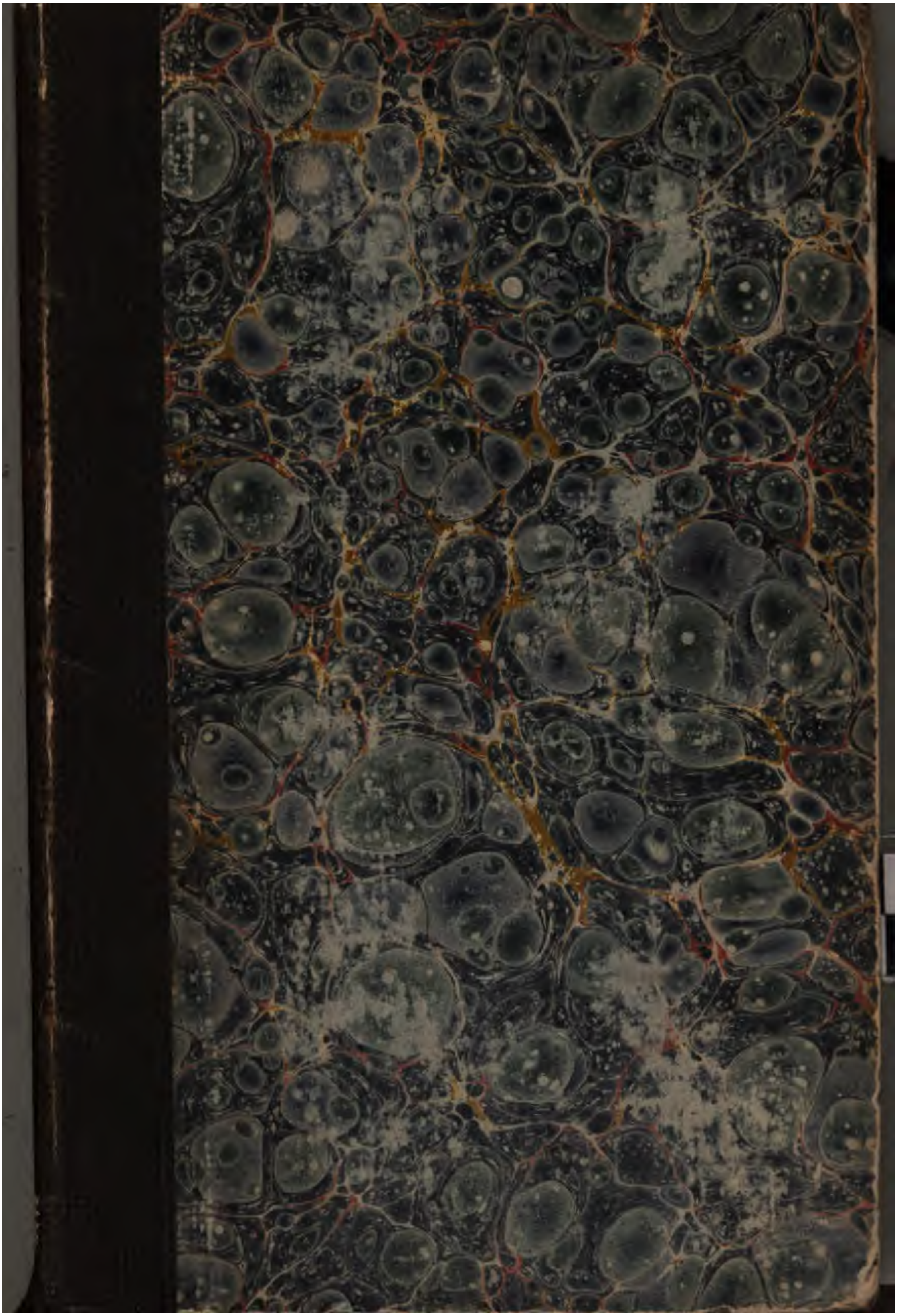

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TREATISE

ON

MEDICAL POLICE,

AND ON

DIET, REGIMEN, &c.

A

TREATISE

ON

MEDICAL POLICE,

AND ON

DIET, REGIMEN, &c.

IN WHICH THE PERMANENT AND REGULARLY RECURRING CAUSES OF DISEASE IN GENERAL, AND THOSE OF EDINBURGH AND LONDON IN PARTICULAR, ARE DESCRIBED; WITH A GENERAL PLAN OF MEDICAL POLICE TO OBVIATE THEM, AND A PARTICULAR ONE ADAPTED TO THE LOCAL CIRCUMSTANCES OF THESE CITIES.

IN TWO VOLUMES.

By JOHN ROBERTON, M. D.

AUTHOR OF THE PRACTICAL TREATISE ON THE POWERS OF CANTHARIDES IN GLEET, LEUCORRHŒA, OBSTINATE SORES, &c. &c. EXTRAORDINARY MEMBER OF THE ROYAL MEDICAL SOCIETY, &c.

VOL. I.

> "*It would be deserting the cause of Humanity merely to deplore the lukewarmness with which the most useful truths are received, and the difficulty of overturning the established routine by which error is transmitted from age to age.*" MORVEAU.

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LONDON.
1809.

TO

THE RIGHT HONOURABLE

LORD ARCHIBALD HAMILTON,

M. P.

MY LORD,

In dedicating this second work to you, I am happy in the opportunity of publicly avowing my respect for the independence of your political conduct, because it is only under enlightened and patriotic Statesmen that plans of great public utility are likely to be realised.

MY LORD,

I have the honour to remain,

Your Lordship's

Most obedient humble Servant,

JOHN ROBERTON.

ST JAMES'S STREET,
EDINBURGH.

"Oh, wave, Hygeia! o'er Britannia's throne
Thy serpent-wand and mark it for thy own;
Lead round her breezy coasts thy guardian trains,
Her nodding forests, and her waving plains;
Shed o'er her peopled realms thy beamy smile,
And with thy airy temple crown her isle!"

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INTRODUCTION.

EXHIBITING THOSE MISERIES OF MANKIND WHICH THE WORK IS INTENDED TO OBVIATE, AND SKETCHING THE PLAN TO BE ADOPTED FOR THAT PURPOSE.

Importance of the Inquiry.

THE prosecution of enquiries, and the detail of observations connected with the preservation and the prolongation of *human life* and *human comfort*, have at all times been justly acknowledged to be subjects of the utmost importance. They have, however, so far as I know, rarely been made the subject of a distinct inquiry, except by men who, from their complete unacquaintance with medical science, have either treated it in an imperfect manner, or enveloped it in such doubt, by evident contradictions, as to render an obedience to their rules impossible, unless human health and comfort, the great objects of such an inquiry, were to be considered only in a very remote point of view.

Motives of the Author

Considerations of this kind first instigated me to undertake the present work; but, notwithstanding my most anxious wishes, I may, in many respects, have fallen short of my aim. Let it, however, be recollected, that even an attempt to investigate, and a wish to point out improvements in, a subject of the greatest importance to mankind, can, from its extensive nature, approximate, only by gradual steps, to a state of perfection. Where no dangerous doctrine is inculcated, injurious either to the physical or the moral powers, and where probably more is delivered, and that perhaps also placed in a clearer point of view, than has hitherto been generally done, faults of omission may be the more easily pardoned.

Transitory nature of Life and Health.

My object is the alleviation of human sufferings, which certainly, from the cradle to the grave, offer a subject sufficiently comprehensive. We are ushered into the world in the midst of lamentation, are too often torn from it in pain and in agony, and the vision of human life speedily terminates. But even when neither pain nor agony in excess assail us, other indescribable sources of misery convince us of the truth of the description of life by our immortal poet,—

> " 'Tis but a walking shadow ; a poor player,
> That struts and frets his hour upon the stage,

> And then is heard no more; it is a tale
> Told by an ideot, full of sound and fury,
> Signifying nothing !"

We may, however, take a more scientific view of it. "Let us contemplate," says Cuvier [*], "a female in the prime of youth and health. That elegant voluptuous form,—that graceful flexibility of motion,—that gentle warmth,—those cheeks crimsoned with the roses of delight,—those brilliant eyes, darting rays of love, or sparkling with the fire of genius,—that countenance, enlivened by sallies of wit, or animated by the glow of passion, seem all united to form a most fascinating being. A moment is sufficient to destroy this illusion. Motion and sense often cease without any apparent cause. The body loses its heat; the muscles become flat; and the angular prominences of the bones appear; the lustre of the eye is gone; the cheeks and lips are livid. These, however, are but preludes of change still more horrible. The flesh becomes successively blue, green and black. It attracts humidity, and while one portion evaporates in infectious emanations, another dissolves into a putrid sanies, which is also speedily dissipated. After a few short days there remain only a small number of earthy and saline particles. The other elements are dispersed in air and in water, to enter again into new combinations."

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[*] Comparative Anatomy.

It is thus that Cuvier endeavours to prove that life enables us for a short period to *resist* the influence of external bodies.

"It was indeed impossible * for us not to feel the frequent necessity of deploring the early fate of those we loved. We, therefore, thought we perceived this principle operating, when the evident influence of external causes, or some mysterious agency, seemed to drive the noblest results of life, intellect and genius, from the philosopher and statesman, who had, by the diffusion of truth and resistance to arbitrary power, preserved the liberties and aggrandized the happiness of nations; we thought we perceived their influence, when imagination's powers fled from the poet whose song had once almost conferred new life on the heroes of ancient times; we thought we perceived their influence when the phenomena of vital action disappeared in the body of the patriot hero in whom they had once developed the noblest specimen of that generous love of social life, which induced him to devote his existence to his country's weal; we thought we perceived their influence, when those magic charms abandoned the lovely female, whose powers had once excited, even from the philosopher, those splendid epithets that ranked her with the other objects of his adoration,—celestial truth and godlike genius; which had obtained, even from the poet, those wonderful strains that at once immortalised him and the object of his song; which had commanded, even in the hero, those glorious devotions which, for far too short a period, illustrated the ever memorable days of chivalry.—When those eyes, whose soft languor had fascinated every beholder; those cheeks, where life had often spread the crimson veil of love,—when these were gone, those eyes were dim and sunk; those cheeks were pale; those lips were livid; that bosom depressed; that form rigid and icy cold; when all had thus assumed the darkest and most frightful hues, had gradually lost cohesion and become one mass of horrible putrescence, whose infectious effluvia now threatened destruction almost welcome to those who once adored the animated being,—it was scarcely possible to feel all this and avoid the conclusion, that life was a state of force."

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* Mr Walker's Introductory Lecture. Med. an Phys. Jour.

Their value, and the little care we take of them.

While, nevertheless, we are irresistably impelled to consider the preservation of such a state as a blessing, we yet, by the most evident and thoughtless omission, permit our health to be blasted by the silent and insidious, yet sure precursors of disease, and never sufficiently appreciate its comforts till we have irremediably lost it,—till they have robbed us of the power of prosecuting our professions or employments, the very means of existence,—till, if our situation in life place us above the want of means, we are, by disease, rendered completely incapable of happiness or comfort. Let our means be what they may, without health they purchase only ennui, and disgust us even while we attempt to enjoy them:

"Without health's cheerful, active energy,
No rapture swells the breast, no poet sings,
No more the maids of Helicon delight.
————————'tis this adorns the rich;
The want of it is poverty's worst woe."

When deprived of health, the rich man is poor indeed; loaded by disease, even the tyrant is tame, the ambitious are humble, and whatever distinctions may have marked them from each other in the days of health and gaiety, they now fast approach that level which death is soon to complete. Their wants cannot now, for one instant, be supplied by useless treasures, which once afforded the only enjoyment they were ever capable of receiving, while the abuse of them enfeebled their frames, and prepared them for the attacks of disease.

The bills of mortality, however defective and inaccurate, demonstrate the awful truth, that few of the human race die of old age, or natural decay; and that by far the greater proportion are cut off by diseases induced by want of care, and propagated by want of attention both to themselves and their inferiors in society,—

"———————— Beneath deciduous shades,
Sits human kind, in hieroglyphic state,
Serious, and pondering on their changeful fate;
While with inverted torch, and swimming eyes,
Sinks the fair shade of mortal life, and dies."

The awful miseries which our neglect induces.

Let us then view the miseries of our fellow creatures as induced by disease. We all know, that wherever ignorant and needy beings are crouded together, there is at once engendered and fomented almost every kind of disorder, vice, vexation and disease. Although, however, this be generally believed, and tacitly acknowledged by all, it is never understood in its true meaning; but by those few physicians who devote their lives to such philanthrophic pursuits. By them, indeed, if they perform their duty, is seen much of human want and human misery, the existence of which the world in general is utterly incapable of conceiving.

Various circumstances, such as the disturbance of mind, and the terror arising to the sick poor, from the shocking view of each others sufferings, their agonies, their ravings, or their dying groans, in the large wards of a crouded hospital, for instance, all plead strongly with humanity for their relief. Sometimes, however, individuals, crowded together, are to be found, in certain situations, not only in a state of disease; but where morality ceases to exist among them. Such is often the case in our jails. " Their miseries," says Dr Johnston, " are not half their evil; they are filled with every corruption which poverty and wickedness can generate between them; with all the shameless and profligate enormities that can be produced by the impudence of ignominy, the rage of want, and the malignity of despair. * In a prison the awe of the

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* For the correctness of these epithets, I do not pledge myself. They could only suit a person who

public eye is lost, and the power of the public law is spent; there are few fears; there are no blushes. The lewd inflame the lewd, the audacious harden the audacious. Every one fortifies himself as he can against his own sensibility; endeavours to practise on others the arts which have been practiced on himself; and gains the kindness of his associates by a similitude of manners."

But when to this, which often happens, is added the malignity of some of our contagious diseases, the misery of such a situation can better be conceived than described. In thousands of the most wretched hovels, the inhabitants are scarcely able to procure the most common necessaries of life,—

> "——— famine is in their cheeks,
> Need and oppression starveth in their eyes,
> Upon their back hangs ragged misery,
> The world is not their friend, nor the world's law."

With them, one room and one bed is not uncommon for a family consisting of from four to fourteen persons; no light or change of air is admitted, but what enters

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was in search of sounding words. *Ignominy* is *not impudent*, *want* is *rarely outrageous*, and *despair* is *never malignant*.

by the door. Their sheets, if they have any on their beds, are not changed oftener than thrice a-year; their blankets if any, are never scoured; and if their beds are furnished with curtains, instead of being cleaned, they are suffered from time to time to drop in pieces from the bed. Certainly no distinct idea can be formed of such wretchedness, by those accustomed to live in comfortable dwellings. Some lie upon dirty rags; others upon old and musty straw; others even upon the bare floors,—often damp and unwholesome. In short, the poor are obnoxious to every thing that can generate, diffuse, and perpetuate contagion; and, at the same time, to all those circumstances which render it most destructive.

Nor is this all, for while the frame is subject to physical circumstances so destructive of health, moral causes combine to irritate, to depress, or to vitiate the mind. The bitter railings of the discontented, the fierce quarrels of the passionate, the mad imprecations of the blasphemer, the wild riots of the drunkard, even the boisterous merriment of the gay, if mirth may here be found, the piteous cries of infants, the complaints of the aged, the moans of the sick, the lamentations of the distressed, preclude the possibility of that repose which is necessary both for the body and the mind. Who would wonder that intoxication, even to stupefaction, should be considered as an absolute refuge from such concentrated misery? Spirituous liquors, the poisonous cordial of grief, while they dissipate the hours of necessary labour, inflame the passions, and, by undermining the strength, render them unfit for future exertion. The inevitable consequence in men is ruin, and their women, reduced by necessity, and provoked by neglect or brutal treatment, are driven to prostitution, whilst their deserted offspring are impelled to beg or steal.

A state of prostitution, which has its sole origin in corruption of morals, excites in the mind of the beholder involuntary feelings of detestation and horror; but when this, which not unfrequently happens, is the expedient adopted for the support of diseased parents, or a numerous family, the feelings of pity must predominate in every mind.

But let us examine the progress of such calamities. Many of those thus circumstanced, who, but for such sufferings, might have been good members of society, are rendered completely the reverse by their situation. While domestic comfort flies, poverty appears on every side; and, while the morals of the children are destroying, they are covered with rags; cleanliness is entirely given up and forgotten; and the whole family is at once involved in dirt and in misery. The husband, who no longer finds pleasure or satisfaction at home, foolishly endeavours to seek for them at the ale-house; and the sober man thus insensibly becomes a drunkard.

By habits of this kind, it will be found, that an amazing number of lingering, yet fatal diseases are produced in consequence of them; and that many thousands drag out a miserable existence, unable either to continue their former practices, or to recover from the effects produced on the withered and emaciated fabric.

In the mornings, the mouth becomes dry and disagreeable, the sleep ceases to be refreshing, and the appetite for food fails. The hands shake, and the wretched sufferer flies again to the bottle for temporary relief; the face is bloated; the breath is horribly disgusting, and a stench issues from the whole of the body; the features are enlarged and inexpressive; the eyes assume a glazed appearance, then become fixed and stupid, and at last watery and tender; their expression is extremely unpleasant, and at length they seem considerably protruded from their sockets; the whole frame becomes either flabby and soft, or emaciated and haggard in appearance; the extremities are shrunk and meagre, the feet unable to support the limbs; and the knees unable to support the body.

During this period, the internal changes are not less striking than the external appearances. The liver principally becomes affected; and a sensation of disagreeable heat and oppression is felt about the region of the stomach; while the bowels, in particular, and the system in general become extremely disordered. The disease of the liver still encreases; heavy gnawing pains are felt in it, distressing nausea, a perpetual inclination to vomit, or vomiting itself, become frequent; violent spasms often seize the stomach and contiguous viscera, and either obstinate torpidity of the bowels, or profuse and debilitating diarhæa, are the only alternatives of the patient.

Neither is their state of mind less changed. Its sensibility, and all its delicate emotions, become gradually blunted. Those qualities, which at any time may have rendered them valuable in private or in public life, are neglected and disgraced. Their society ceases to be coveted, they become torpid, and mere outcasts upon the earth. Their mind becomes equally indifferent to every thing past or future; hope is extinguished within their breast, and even the prolongation of existence becomes a matter of indifference to them. Thus the wretched and almost unpitied sufferer lingers out a few tedious years, equally insensible to every kind of enjoyment, but the prospect of again reducing himself to a state of insensibility by intoxication.

Delirium at length ensues, and reaches sometimes its wildest state, though even without this dreadful addition, the victims of these disgusting habits become an intolerable burden to their nearest relations, who feel it impossible to pity them to the extent of their misery, because it can never be removed from their mind that they themselves have been the voluntary causes of their own sufferings.

Dropsy, in one or other form, at length supervenes, and the encreased bulk occasioned by it, added to the horrid and disgusting appearance of the person in every other respect, exhibits a most shocking spectacle.

While slight convulsions now announce the termination of the scene, the dropsy encreases, the skin of the swoln limbs becomes thin and tender; at last it bursts, mortification ensues, and horrible convulsions, during which existence is still for a few hours painfully prolonged, carry off the patient, who has thus been tormented by a death as slow as his disgusting habits have been gradual.

But even if fortunately these should not be his habits, nor this the termination of the scene, it is impossible, under any similar circumstances, for the father of a family, for instance, to attend to the wants of his children, and they are consequently obliged either to steal, or to apply for assistance to the public. Thus, by degrees, they also become more and more morally depraved, and disease, in one form or other, does not fail to contribute its share to increase their sufferings. The whole family, improvident for the future, while their labour enabled them to obtain the means of subsistence, perhaps, in their most provident days, earning too little to admit of saving, every evil is now doubled. If the father be confined by disease, the source of his family's support is at once cut off; if the mother be the person attacked, so much of her husband's time is employed in attending her, and in supplying her place to her children, that less of it can be devoted to labour for their support: in either case, with an increase of expence, the means of defraying it are diminished, and some article from their already small stock of clothes or furniture, is every day disposed of, to enable them to meet the exigency of the moment. They are frequently obliged to beg, borrow, or pawn one article to enable them to buy another.

Of those who can commiserate and relieve the sufferings of their fellow creatures, it will only be necessary to call the attention to the additional horrors concentrated in the wretched dwellings of the poor, where contagious fever rages. Such scenes at all times arrest the feelings, even of the most careless observer; and it is calculated that, in this case, (which, if possible, increases the evil), the proportion of adults infected and destroyed, considerably exceeds that of children; that the number of men who perish is much greater than that of women, and that of a family exposed to contagion, the father generally suffers first.

Scantily subsisted by his daily labour, what must the distress of the poor man be, when unnerved by disease, prostrate on a sick bed, and wanting aid from a starving family, whose support has, till that moment, entirely depended on his unremitting toils, and who even yet look only to him?

The ghastly countenance, the squalid skin, the convulsed or wasted muscles, the putrid fætor, give dreadful proofs of the malignity of that disease which, in a few days; sometimes even in a few hours, extinguishes life, and converts the frame, almost before death, into a mass of putrescence.

Though this most awful extreme of contagious fever is not very prevalent in this country, it is still fatal to thousands in the obscure and loathsome retreats of poverty. There, every circumstance refines the poison, prepares the victim, and hurls him to rapid dissolution ; unheeded by the affluent, the gay, and even the humane ; and too often avoided by the timid and the ignorant.

He lies, then, in a bed which would produce disease even to the healthy, absorbed in his own fœtid and contagious perspiration, till he either dies or accidentally recovers. His few attendants, or his helpless family, though unaffected by such diseases, are, from other causes, perhaps equally miserable. And what must be their danger, as well as misery, who consume the day in the same cell, almost in contact with the sick, and waste the night on the same pallet of disease and wretchedness ?

Let even the hardened and unfeeling, or the thoughtless and voluptuous, enter for a moment these receptacles of pestilence and death ! Let them breathe the noisome vapours ! Let them hear the cry at once of want and pain, the incoherent mutterings of wild delirium, the groans of the expiring, and the wailings of the miserable survivors! Let them behold the sick, the dying and the dead!

One would at least expect the infant to be exempt from this accumulation of wretchedness, and would hope that the bosom of its mother might remain to soothe it; but.... the tears of the mother drop upon her infant;—her bosom is collapsed;—its vessels are exhausted;—the fountain of life is dried up. What can the wish of the mother,—what can her filial love,—what can the hoarse scream of her thirsty infant,—what can its vain suction, effect?

On the same bed, perhaps, are children shivering in the cold, and burning in the hot stage of fever; one raving in delirium, frantic or stupified with despair; another breathing his last, or extended a disfigured and loathsome corpse. Probably some squalid daughter of poverty, careless of life, may administer the produce of rags in pawn;—possibly some friend of humanity, absorbed in pity, and defying danger, may pour out the antidote, whilst he inhales the poison.

Let even the unfeeling contemplate this scene of consummate wretchedness, and withhold, if he can, the tribute of humanity!

If to the feeling, the inspection be too dreadful, or they doubt the reality of such scenes, let them enquire of those physicians who have the humanity and the courage to extend their aid to the infected poor. Let them listen to the reports of those who expose their lives in those magazines of pestilence, and have their feelings harrowed by the complication and the intensity of misery.

The insidious and unrelenting enemy saps, by degrees, the constitution of the infected, who becomes weak and dejected; his countenance is pale and sunk, his skin sallow, and his whole frame diminished. The head feels heavy and painful; the mind inert and confused, yet anxious. The heart is languid and oppressed; the circulation feeble, hurried, irregular. The lungs perform their function with painful effort; breathing is frequent, audible and interrupted by groans and sighs. The blood is irregularly propelled by the irritated and convulsed heart, and alternate chills and flushes creep along the skin. The muscles feel weary, tender, tremulous; the joints burdened and aching. The saliva becomes viscid, the mouth clammy, the tongue white, and covered with mucus; the taste indistinct, maukish and disagreeable. Appetite fails; distaste and loathing of food soon follow. The bowels participate in the weakened and disturbed action of the stomach, and are either torpid or irregular. Almost all the secretions are disordered or vitiated. The bile is increased, attenuated, acrimonious. Sometimes it is accumulated, and then absorbed; at others, it regurgitates into the stomach, or inundates the intestines. An indiscribably painful sense of weight and weakness oppresses the loins and the kidneys. The urine, at first pale, limpid and copious, is now high coloured, turbid and scanty. The sick, though often oppressed and drowsy, is incapable of rest; or, if he sleep, is disturbed, agitated, and wakes unrefreshed.

These symptoms fluctuate for a short time, but are gradually aggravated; the pain in the head increases, delirium and stupor ensue. The motion of the heart is accelerated, and its powers are exhausted. The oppressed lungs rapidly convert the air they inspire into a hot, offensive and noxious vapour; the parched skin burns with an arid and consuming heat, or effuses partial, clammy, fœtid sweats. Voluntary action is gradually abolished; involuntary convulsive motions succeed. The solids are relaxed, the fluids effused, the tongue and mouth are parched, and encrused with black and sordid mucus. The stomach nauseates or rejects whatever is forced into it; the bowels accumulate, with oppressive tension, indigested, fœtid, putrid, contents, or pour them out profusely and involuntarily. The urine is cloudy, dark, thick, offensive. The wan and sallow countenance becomes flushed, bloated, and by degrees muddy, lurid and cadaverous. At length the blood retires from the extremities to the faint and palpitating heart. The chill of extinction follows its retreat. The breath struggles in its passage through the collapsed and obstructed lungs. The frame harrassed, oppressed, exhausted, sinks into dissolution.

Language cannot represent the extreme and complicated wretchedness of a family in this situation.

The physician and surgeon who attend often witness misery, which they cannot alleviate, and which, lest it might seem exaggerated, they decline attempting to describe.

The father, then, not unfrequently dies, and his orphans become a burden upon the public.

The children are infected from the new source of contagion; and the mother, after closing the eyes of her husband, and perhaps of more than one of her offspring, sinks exhausted with grief, watching, and fatigue, and is herself the last miserable victim of the disease.

It is the prospect of another and a better world alone which supports them under these complicated miseries. It is this prospect which bears them up against the continued wretchedness which presses so heavily upon them.

The removal of these miseries a National object.

Let the statesman, however, estimate the baleful influence of contagion in the productive powers of the labourer, manufacturer and mechanic! Let him calculate the decrease of a country's wealth from this subtile, active, wide wasting destroyer.

Nor ought we merely to consider its influence at home: the oppression and misery of our colonial slaves subject them, under another form, to its most destructive ravages. These can alone be prevented by obviating the causes which induce them.

"Ye bands of Senators! whose suffrage sways
Britannia's realms, whom either Ind obeys;
Who right the injured, and reward the brave,
Stretch your strong arm, for ye have power to save!
Thron'd in the vaulted heart, his dread resort,
Inexorable Conscience holds his court;

With still small voice the plots of guilt alarms,
Bares his mask'd brow, his lifted hand disarms;
But wrap'd in night, with terrors all his own,
He speaks in thunder when the deed is done.
Hear him, ye Senates! hear this truth sublime.
HE WHO PERMITS OPPRESSION SHARES THE
CRIME.

Had the last British administration done nothing more than rescued from oppression this half of the human species, that act alone would have placed them high in the esteem of every well-wisher to humanity.

The Rich as well as the Poor subjects of them.

The insidious approach, and innumerable channels, by which these destructive diseases make their attack, interest, among the rich, the selfish as strongly as its lamentable consequences call upon the benevolent, to extirpate it. The safety of the former, who ought to be, but are not, aware of their exposure, should irresistibly force their co-operation in suppressing it, whilst the sufferings and destruction of the poor must, when known, irresistibly call forth the aid of every one who is susceptible of pity, and possesses the means of rescuing from the most dreadful calamity the lives of his fellow creatures.

" Ah little think the gay,————
Whom pleasure, power, and affluence surround,
How many feel, this very moment, death,
And all the sad variety of pain :
———————— How many drink the cup
Of baleful grief, or eat the bitter bread
Of misery ! sore pierced by wintry winds,
How many shrink into the sordid hut
Of cheerless poverty,—— ————
How many, rack'd with honest passions, droop
In deep retir'd distress.————————
———— But " form'd of such clay as theirs,
The sick, the needy, shiver at their gates.
Even modest want may bless their hand unseen,
Tho' hush'd in patient wretchedness at home.
There are, while human miseries abound,
A thousand ways to waste superfluous wealth,
Without one fool or flatterer at your board,
Without one hour of sickness or disgust."

Let it be recollected, that a depressed situation in life does not imply a mean or sordid spirit ; neither does an opulent and elevated station confer a generous one ; of which last, indeed, the necessity of the present attempt to induce the rich to commiserate the neglected sufferings of the poor, affords the strongest proof. A noble mind with a small fortune, generally has, and ought to have, a share of pride and sensibility, which are easily wounded by obligations indelicately conferred ; and when keen sensibility is thus, which is not unfrequent, added to poverty and disease, the picture of human misery is complete.

Sometimes, however, the prosperous turn away their eyes from the miserable, not through insensibility, but because the sight interrupts their gaiety.

Let them be aware, however, that from whatever motive it may proceed, even such conduct does not exclude them from the many chances of being infected by contagious diseases; for, by the dispersion of the property of the infected through the medium of pawn-brokers, rag-shops, and by contact in innumerable ways, the poison is communicated where least suspected. Who, indeed, is secure when we consider how society are linked together? Hackney coaches and other public vehicles imbued with it, rapidly extend its progress. Religious functions, even charitable offices, official duties, public spectacles and amusements, multiply its sources, and may doubtless carry the contagion through every intermediate rank from the cottage to the palace.

It is obvious to every one, that the latent poison may be imbibed from the very necessaries of life, and the means of comfort.

Its thoughtless and unsuspecting victim is sometimes arrested whilst in the full vigour of health, and the elevation of gaiety. He is still oftener fatally assailed when debilitated or depressed.

It were well that the affluent would relieve such wants when they are pointed out to them by those who, from the nature of their profession, are every day in the habit of witnessing such scenes. The physician, as the late Dr Gregory justly observes, has many opportunities of seeing people, once the gay and the happy, sunk in deep retired distress; sometimes devoted to a certain, but a painful and a lingering death.

"——————— the coy stomach loaths
The genial board; their cheerful days are gone;
The generous bloom that flush'd their cheeks is fled.
Their vigor pines; their vital powers decay;
Diseases haunt them; and untimely age
Creeps on, unsocial, impotent.————————
——————— in dim suffusion lies
The glance divine, that lighten'd in their eyes;
Cold are those lips, where smiles seductive hung,
And the weak accents linger on their tongue:
Each roseate feature fades to livid green,—
—Disgust with face averted shuts the scene."

Diseases absolutely of the most malignant kind have raged even in our island, sparing neither sex, age, or condition; and, were the same causes which once produced them suffered to exist, or rather to accumulate, there is no question that, in every part of it, they would again become equally malignant. The following picture, during one of those epidemic diseases called plagues, in London, is, as drawn by the poet, perfectly correct.

" ———————— thick and pantingly
The breath was fetch'd, and with huge lab'rings
heav'd.
At last a heavy pain oppress'd the head;
A wild delirium came; their weeping friends
Were strangers now, and this no home of theirs.
Harrass'd with toil on toil, the sinking powers
Lay prostrate and o'erthrown; a ponderous sleep
Wrapt all the senses up; they slept and died.
In heaps they fell: and oft one bed
The sick'ning, dying, and the dead contain'd.

But that drawn by the historian even chills us with horror: " In the month of July, the bill encreasing to two thousand and ten, all the houses were shut up, the streets deserted, and scarce any thing to be seen therein; but grass growing, innumerable fires for purifying the infected air, coffins, pest-carts, red crosses upon the doors with the inscription of *Lord have mercy on us!* and poor women in tears with dismal aspects, and woeful lamentations, carrying their infants to the grave; and scarce any other sound to be heard than those incessantly emitting from the windows, of *Pray for us!* and the dreadful call of *Bring out your dead!* with the piteous groans of departing souls, and melancholy knells of bodies ready for the grave."

Thus I have described these miseries, let us now generally view the manner in which they ought to obviated.

Mode of obviating them.

We naturally question every new fact, or hypothesis, and the more so in proportion to its novelty and its importance. This however, is not the way by which the sphere of our knowledge is to be enlarged. "It is not," says Gregory, "philosophical scepticism, nor a humble opinion of our present knowledge that ought entirely to sway us; for these check the spirit of enquiry. A mean opinion of the human powers effectually chills the ardour of genius, and blasts all grand and extensive views of improvement. Such contracted notions ought never to be countenanced; for the physician, even while he deems it impossible to afford relief, ought to attribute that difficulty to the narrow limits of his knowledge, not to the impossibility of improvement."

'In such situations, he ought not, however, to omit the administration of consolation and comfort.' He has numberless opportunities of giving that relief to distress which the wealth of India cannot purchase; and this to a benevolent mind must be one of the greatest of the pleasures it can ever hope to enjoy. Were the physician to employ himself in such offices at times when the very imperfect state of his profession will not admit of his exercising duties of a more important nature, he would fulfil even what the most rigid could expect of him. But different, indeed, is often his task.

'When a physician sets out in life, he quickly perceives, that the knowledge most necessary to procure him a subsistence, is not the mere knowledge of his profession. What he finds more essential to that purpose, are the various arts of flattery and insinuation, and that of deceiving mankind into a high opinion of his understanding, by an appearance of solemnity and importance in his manner; views very different from those of genius and science. He can, with difficulty, find a patron to his real merit, because none are judges of it but a few of his own profession, whose interest it is that it should be concealed. If he attempt to shew the weakness of the fashionable system, or to introduce any alteration in the practice, the whole faculty are alarmed; their vanity is piqued, in having opinions, which they thought perfectly established, brought into question, and exposed by a young man; and their interest is evidently concerned to crush him as soon as possible. In the meantime, the effect of every deviation, which he makes from the common practice, is anxiously watched, all his prescriptions must remain upon the apothecary's file, to rise in judgment against him; and, upon any miscarriage, the outcry is raised and propagated with the utmost malignity.

This diabolical plan of persecuting the proposers of improvements, must, by repetition, change the conduct of the most firm. Yet the discerning, who by the bye, are always the minority of society, will make the just distinction. They will, on comparison, know to whom the merit is due.

If a physician visit his patients at stated periods, and prescribe for them according to rule, without giving himself further trouble, he ought to be considered as a mere artist, and one too of a very dangerous kind to society; but if, on the contrary, he take a judicious view of his subject, cautiously endeavour to scrutinize each disease, compare these with the state of his patient, and deduce his plan of treatment from all these circumstances combined, he is then justly entitled to the name of a philosopher in a science of the utmost importance, and of the greatest utility to the human race.

I must, with Gregory, observe, that by what I have said, I have no intention to lessen the dignity of a profession, which has ever justly been considered as most important and honourable. For this dignity is by no means to be supported by a narrow, selfish corporation spirit, by a peculiar formality in dress and manners, or by affected airs of mystery and self-importance. The true dignity of that profession may be best maintained by the superior learning and abilities of those who profess it, by the liberal manners of gentlemen, and by that openness and candour, which disdain all artifice, which invite a free enquiry, and which, by that means, boldly bid defiance to all the ridicule and satire which physicians have, by their own conduct, so justly deserved.

If ingenious men, (for the profession does involve many of them), would devote half the time to the study of nature, which they waste upon the study of opinions, their science would make much more rapid progress.

Often, however, for many years after the commencement of the practical part of a medical man's career, he has to strive with many difficulties, part of which are common to all professions; but the most important of which are peculiar to the medical profession alone. He has to establish his professional reputation against the malevolent and the secret illiberality of those whose interests interfere with his, and who, from selfish motives, have been anxiously watching for his fall. Certainly, in the midst of all this, to advance in knowledge by the slow, painful, and laborious task of watching the sick, and carefully attending to the rise and progress of disease, requires a degree of patience and self-denial, as difficult of attainment perhaps as more splendid qualities.

The physician ought first to make himself acquainted with all the causes of epidemic disease, carefully to note the influence of temperature in each; its effect also combined with a dry or a humid atmosphere, as influencing persons of the same and of different temperaments and habits; he ought to calculate the effect of each of these causes of epidemic disease, under all this variety of circumstance, upon persons of each different constitution; for the same combination of circumstances which in one person may produce a pleurisy, will only maintain in another the excitement necessary to health. He ought also to calculate the influence of the patient's local situation and manner of living; the indispositions to which his family, profession, or country, are most subject, and the effects which the changes of the seasons usually produce upon him.

By observing these rules, a man of patient industry and careful attention, even with pretentions to nothing more than plain good sense, will be able to distinguish from each other the successive epidemics of the year, and will discover whether they are simple or blended with each other, or with different diseases. He will thus have signal advantages over those persons of our profession, who have no other data for their reasonings than the mere symptoms of the moment, the imperfect accounts of a disordered patient, or the impertinent ones of a silly nurse, by which even they, if their practice be extensive, must too well know they may be most fatally misled.

With regard to myself, I deem it my bounden duty, and claim no merit, for having voluntarily penetrated the most miserable habitations—the recesses of poverty and of disease; and having witnessed the most distressful and humiliating scenes which human nature is capable of supporting. Some of my fellow creatures I have seen sensible of their wretchedness, and heard express the deepest, and alas! the most ineffectual regret, that their want of friends and of money had placed them in situations where they were so liable to disease. Others I have seen sunk in the completest apathy, exhibiting a picture of moral, as well as physical, depravity, the remembrance of which no future circumstance ever can efface from my mind.

It ought to be recollected, that it is not the object either of the mere philanthropist, or of the magistrate, to suggest plans for the removal of disease. The former ought pathetically to paint the sufferings of his fellow creatures; the latter ought to execute schemes for their relief; but the task itself belongs to the physician. The common object of all, however, ought to be the removal of those well known sources of disease, whose influence every hour robs families of their parents, and countries of their patriots; and while we mourn over the wreck of humanity, while we deplore the premature loss of those whose virtues have commanded our admiration or our respect, let it not be forgotten, that the causes of such calamities at this moment surround us.

Upon this subject, Mr Howard not only actually did much, but suggested several useful plans, and furnished many valuable hints which never have been sufficiently attended to. It is to be regretted, however, that he confined his observations almost entirely to the description of the jails he visited. The causes of disease, however, which he there detected, and the able manner in which he has described them, give us reason to believe, that had he favoured us with a brief description of the country in the immediate neighbourhood of these jails, and the relation in which they stood to external causes, he would have rendered his work complete; nor would there have been so much necessity for presenting the present one to the public.

Never had poetry a worthier subject than the exertions of Mr Howard.

"And now, PHILANTHROPY! thy rays divine
Dart round the globe from Zembla to the line,
O'er each dark prison plays the cheering light,
Like northern lustres o'er the vault of night.
From realm to realm, with cross or crescent
crown'd;
Where'er mankind and misery are found;
O'er burning sands, deep waves, or wilds of
snow,
Thy HOWARD journeying seeks the house of woe.
Down many a winding step to dungeons dank,
Where anguish wails aloud, and fetters clank;

To caves bestrew'd with many a mouldering
bone;
And cells, whose echoes only learn to groan;
Where no kind bars a whispering friend disclose,
No sunbeam enters, and no zephyr blows,
He treads, inemulous of fame or wealth,
Profuse of toil and prodigal of health,
With soft assuasive eloquence expands
Power's rigid heart, and opes his clenching
hands;
Leads stern-ey'd justice to the dark domains,
If not to sever, to relax the chains;
Or guides awaken'd mercy through the gloom,
And shews the prison, sister to the tomb!—
Onward he moves! disease and death retire,
And murmuring demons hate him and admire."

Plan of the Work.

The present work is not designed as a systematic treatise on diseases, the reader must not therefore expect to find a minute and prolix detail of their nature, symptoms and methods of cure: My purpose is rather to point out and describe the nature of the permanent and regularly recurring causes of disease, and the modes of obviating them. Throughout this task, experience and reason are the guides I shall attempt to follow, without regarding the methods which are too often practised, and which seem more calculated to create unnecessary mystery, than to add to the stock of our information.

Although the rules resulting from this investigation, and necessary to effect its purposes, scientifically considered, must have their origin from a particular profession; yet, popularly understood, they will be readily comprehended, and will accord with the experience of every person of moderate education.

No tedious discussion, respecting the various opinions concerning the nature of individual diseases, will be introduced, but such as may be understood by every one; and every one being in some measure employed in the care of his own health, and having formed some opinion concerning air, diet, exercise, &c. the subject may be considered as universal.

I am well aware, that the general arrangement of such a plan as it may be necessary to follow upon this interesting subject, is replete with difficulty; and that the particular one which I have here indicated, may, in many points, be susceptible of improvement; but, as it will ultimately be productive of numerous benefits, as far as health is concerned, it must become a subject of great national importance. If, indeed, even the life of a single individual be preserved by my exertions, I shall be contented, in the expectation that others, improving the principle, may at length bring my plan to a state of greater perfection.

Many of my opinions on this subject must long have been familiar to every one; as several of those causes which first induced me to think seriously about it, have been acknowledged sources of disease from the earliest periods of history; but, so far as I am acquainted with the writings of former times, no author has been fortunate enough, either from incorrect statements of facts, or from deficient modes of reasoning, to induce the Legislative body of this country to adopt a general systematic plan for their prevention.

The principal general sources of disease in this, and perhaps in every other country, I believe, with very few exceptions, to exist in external, and for the most part, removable causes; but, from our familiarity with numberless circumstances which are unquestionably injurious to our comforts, and even destructive to our constitutions, we, in the common bustle of life, insensibly so overlook them, as scarcely ever to regard them in a just point of view. Many are willing to allow, that these sources are injurious to their comforts; but few believe them capable of ruining their constitutions.

The fenny counties of England, and other swampy grounds, most of which, though drainable, are still suffered to exist, form well known sources of disease; and that uncleanness and filth which, in every part of our island, obtrudes itself upon our notice, contributes no small share to the propagation of them.

The local situation, and internal structure of dwelling-houses, also constitute another great source of them.

In earlier times, both these causes must have greatly contributed to their propagation and frequency; and although history informs us of uncommon feats of strength performed by individuals in former times, yet from this we can draw no conclusion respecting the health of ancient nations in general; for, I believe, that in every part of the world, the greatest proportion of its inhabitants have passed their lives in obscurity; and although employed in the most useful pursuits, their names and their diseases are equally unknown to us: they are only rare occurrences, magnified by tradition, that have been transmitted to us.

But whatever diseases are found to arise from these, or indeed from any general cause—any derangement of natural objects, I am convinced they may, even in the present imperfect state of physics, though with difficulty, be wholly, or for the most part, removed.

That the removal of many such nuisances, the causes of all these calamities, should never have been thought of, particularly in Great Britain, where scientific research constitutes so prominent a feature of the national character, has to me often been a matter of surprise and wonder. The adoption of such a plan would not only contribute to the happiness of individuals, but to the increase of the public revenue; as the healthy state of a country is one of the greatest, is indeed the first, cause of its prosperity and affluence.

The wealth of all nations arises from their quantity of productive labour; and therefore whatever proportion of unproductive individuals exist in any country, not only is a similar proportion of wealth lost to it, but an additional proportion of its wealth is destroyed. Mr Malthus has proven, that an increase even of active population would, at the present moment, be prejudicial to Great Britain. How infinitely more so must an increase of inactive population be, not only as affording no aid to the revenue from the taxation of labour or of income, and as being burdensome to their respective parishes, but as more completely exceeding the means of subsistence !

The fate of humanity is sufficiently unhappy, but while we lament this, we ought not to forget, that the greater number of the calamities which oppress us proceed from ourselves.

The WORK will be divided into THREE BOOKS, the *first* of which is *general*, and the *others particular*.

The FIRST BOOK is divided into TWO PARTS; the *first* of which alludes to the sources of disease, and the *second* to the modes of preventing or of obviating them.

The FIRST PART is divided into THREE CHAPTERS; of which the *first two* explain the causes, the *third* the reasonings upon these causes, and the diseases produced.

The NATURAL CAUSES are *soil*, *climate*, and *situation*. The ARTIFICIAL CAUSES are the *construction of houses*, *occupations*, *modes of living*, and *manners* in general.

Of the NATURAL CAUSES, which form the first chapter, I first take notice of soil in general, because to it climate, afterward to be mentioned, in a great measure owes its existence, as from it those effluvia arise upon which, simply, or in consequence of [illegible] [illegible] with each other, many [illegible] depend.

[illegible] consider the nature and influence [illegible] in different parts, and under different circumstances, because I consider it in a great measure, the result of the soil previously described.

Situation and its effects are next explained, with the influence which it has upon the health, &c. because it involves both the former.

Thus I studiously avoid the discussion of any point till the principles upon which such reasonings depend have been fully explained.

Of the ARTIFICIAL CAUSES, which form the Second Chapter, and are next to be considered, the first, according to my arrangement, is, the construction of houses, and their connection with, and influence upon, the previously considered points.

The occupations, modes of living, and manners of the people, as influenced by the previous circumstances, will successively form the other subjects of enquiry.

The SECOND PART is divided into TWO CHAPTERS. In the *first* of which is explained plans of *police*, by which diseases arising from the foregoing causes may be prevented. The *second* includes the *pratical methods* by which the diseases themselves may be remedied.

Observations more or less minute, according to their importance, respecting these plans of police, for each individual subject previously considered, shall form the various sections of the first of these chapters, arranged exactly in the order in which these subjects have been detailed.

BOOK SECOND is precisely a counterpart of of book first, and all the principles detailed in it are particularly applied to the local circumstances of EDINBURGH.

BOOK THIRD is also a precise counterpart of book first, and all the principles detailed in it are particularly applied to LONDON.

Throughout the work I have endeavoured to profit by the observations of every valuable writer upon the subject. As the objects of their works are truly philanthropic, the extension of the principles which they involve cannot be unpleasant to them. From the works of Pringle, Lind, Morveau, Bertholet, Russell, Stanger, &c. I have derived an assistance which it gives me the greatest pleasure to acknowledge.

Throughout I have also endeavoured to make the work as popular as a scientific enquiry would admit of.

In concluding this Introduction, I beg leave to say, that communications from medical or scientific men on the subject of the work, will be deemed the highest favour.

St James's Street, Edinburgh.

BOOK I.

OF THE GENERAL LOCAL CAUSES OF PERMANENT AND REGULARLY RECURRING DISEASES; AND OF THE GENERAL POLICE FOR THEIR REMOVAL.

PART I.

OF THE GENERAL CAUSES OF DISEASE.

CHAP. I.

OF NATURAL CAUSES.

SECT. I.—*Of Soil.*

Reasons for the Mode of Investigation here adopted.

ALTHOUGH the derangements of climate have, perhaps, of all natural causes, the greatest influence in the production of disease, yet as all the aeriform fluids composing the atmosphere, as well as those which are often blended with it, are productions of the superficies of the earth, or of the various substances which exist upon it, it is soil evidently which demands our first attention. Indeed, it is only from such substances, that the component parts of the atmosphere can be obtained. We have proofs, therefore, that the atmosphere is entirely a production of the soil, and that when portions of it are vitiated, or otherwise rendered unfit to support animal or vegetable life, it is from this source alone that the injury arises, and from this source only that it can possibly be repaired.

Composition of Bodies.

The soil, strictly speaking, consists of mineral, and of the remains of vegetable and animal, bodies.

With regard to mineral bodies, many of those substances which, in former times, we were taught to consider as elementary, have gradually, as science has advanced, been found to be of a compound nature. Modern chemists have indeed clearly proved, that numerous bodies which, even till very lately, were conceived to be of an elementary kind, are actually compounds.

Natural philosophers, nevertheless, enumerate a considerable number of bodies which they yet consider as simple; not that they actually believe these to be simple bodies, for every analogy opposes such a supposition, but because they have not been able to decompose them by the usual modes of analysis.

A brilliant step, however, has lately been made towards the reduction of these simple bodies, and the earths and alkalies are now shewn to be merely metallic oxyds. But it is highly probable that the metals themselves are compound bodies; and as we every day find a greater and greater number of substances reduceable to the aeriform fluids, analogy entitles us to conclude, that they alone are simple. It is even questionable how many of these are elementary. Indeed, I need not merely urge analogy in favour of this opinion: we have the most decided proofs of its truth; for, in the composition of vegetables, supported solely by air and water, we find, by chemical analysis, that there is both alkaline and metallic substances. Now it is extremely evident, that these bodies could not exist there unless produced by new combinations, formed among the constituent parts of the air and water absorbed by the vegetables.

Motion of Bodies.

The consideration of the motion of bodies naturally follows that of their composition. With regard to it, Mr Boyle observes, that "local motions, which are wont either to be past by unobserved, or to be thought not worth the observing, may have a notable operation, though not upon the generality of bodies, yet upon such as are peculiarly disposed to admit it, and so may have a considerable share in the production of divers difficult phenomena of nature, that are wont to be referred to less genuine, as well as less intelligible causes."

This philosopher, whose accuracy of investigation must always stand high, further asserts, that absolute rest does not exist in nature, and, in the following way, illustrates the disposition of minute bodies to motion. A leaf of paper displayed, will much longer hover in the air, than if it were reduced into smaller compass. This minuteness of particles disposes them to be carried upwards by the impulse of other bodies, and by that of the agitated air; thus, we see, that horses in the high-way, though they do not, with the strokes of their feet, make stones or gravel fly up, yet easily raise clouds of dust, often mingled with the smaller grains of sand. And where timber is sawing, the same wind that does not in the least move the beams, and scarce at all the chips, easily carries up the saw-dust into the air. And we see, that while smoke readily ascends, even small clods of soot, which are aggregates of the particles of smoke, fall to the earth. Again, when water and several other liquors seem to be continued masses of matter, and as much at rest as the very glasses that contain them, their constituent particles are in an actual and varied, though slow and unperceived, motion.

It may be proved, that similar motions take place among the particles of the very hardest bodies. If a spring, though made of so hard a body as steel, be forcibly bent, and kept but a short while in that position, as soon as the force that kept it bent is removed, it will again return to its former figure; but if it be kept too long in that forced position, it will by degrees lose its elasticity, and retain a curved form, though the force that bent it be removed. This shews, that there is a continued endeavour of the parts of bodies to assume new states.

Although, therefore, distinct masses of matter may appear at perfect rest, the particles composing them may thus be in continual motion.

It is not perhaps easy for us to imagine such slowness as it is very possible for nature to make use of in her operations, though our not being able to discern the motion of a shadow on a dial-plate, or that of an index upon a clock or watch, ought to make us sensible of the incompetence of our eyes to discern many motions of natural bodies, which reason assures us must be incomparably slower than these.

This is the general tendency of M. Boyle's arguments, and we cannot deny them the praise of great ingenuity.

Effluvia of Bodies.

The consideration of the effluvia of bodies properly follows that of their motions, and leads to the investigation of the influence of these effluvia in the production of disease.

The complete dissolution of matter happens in no one instance with which we are acquainted. Alterations in its appearance and sensible properties, however, take place every moment; we witness this in the perpetual changes going on in the world around us—in the production of new animated beings on the one hand, and, on the other, in the death of those whom we may have loved or admired.

Now, that fluid bodies, such as liquors, and those which are manifestly moist or soft, should easily send forth emanations, will without difficulty be granted; especially considering the sensible evaporation that is obvious in water, wine, &c., and, approaching to this, that loose contexture of parts which constitutes all soft bodies. But that even hard and ponderous bodies, notwithstanding the solidity and strict cohesion of their component parts, should likewise emit effluvia, will to many appear improbable.

Though a considerable part of the air which thus arises from fluids may seem to have existed in an elastic state within them, yet the air to which we now allude as arising from solid bodies, either by the force of fire or of natural evaporation, cannot arise solely from the interstices of these bodies, but also from the most fixed parts of them.

Substances thus constantly emit part of themselves, and these emanations are often so extremely minute as to be completely invisible, or to be seen only under peculiar circumstances.

During the summer, for instance, and especially at noon, while the sun shines, bodies even appear to have little atmospheres around them. I see not, therefore, why we may not be allowed to ascribe atmospheres at all times to such bodies as they are observed to have at such periods.

A very great number, if not the greatest part, of animal, vegetable, and mineral bodies, may thus emit effluvia; and even those that are solid may, at least sometimes, have their little atmospheres, though the neighbouring bodies must often prevent the evaporations from extending equally in every direction around them.

Now, when we consider that those substances are the most unlikely to afford such effluvia, which are either very cold, or very solid, hard and ponderous, if it can be shewn that none of these qualifications can prevent a body from emitting effluvia, it must appear highly probable, that there is no sort of bodies incapable of affording these emanations.

Ice, then, is one of the coldest bodies we know, yet it loses by evaporation. Mr Boyle proved this by experiment; for, says he, " having counterpoised a convenient quantity of ice in a good balance, forthwith exposed it therein to a cold air of a frosty night, that the evaporation should be from ice, not from water, I found the next morning, that though the scale wherein the ice was put was dry, which argued, as well as the coldness of the weather, that the exposed concretion had not thawed, yet I found its weight to be considerably diminished, and this experiment I successfully made in more than one winter."

Mr Boyle further ingeniously remarks, that, " for aught we know, the decrement of bodies in statical experiments long continued, may be somewhat greater than even nice scales discover to us; for we are not sure that the weights themselves may not in time suffer a little diminution in their weight, as well as the bodies counterpoised by them."

Subtility of these Effluvia.

Various hypotheses have been formed respecting the subtility of different effluvia. The most dangerous hypothesis, however, to improvement of any, is that which denies all useful investigation beyond what its author, in his mode of reasoning, has been already capable of pointing out.

Of this sort are those of certain philosophers who, in treating of the minuteness of bodies, will not only have the effluvia of matter, but even its parts, to stop at certain solid particles, which, from their not being further divisible, they term atoms; yet the assertors of this justly think themselves injured when they are charged with taking for their atoms the motes or small dust that float in the sun-beams; since, according to them, one of these little grains of dust may be composed of a multitude of atoms, and exceed many thousands of them in bulk.

With regard to minute animal bodies, it may be observed, that the mites of cheese are generated in eggs, and in these eggs, as in ordinary ones, the animal, at its first formation, bears but a small proportion to the bulk of the whole egg, the remaining part being destined for the food of the embryo. Now, the whole egg itself will be allowed to be but little, in relation to the mite which produced it; how extremely minute may we therefore suppose those parts to be which contribute to form its numerous delicate organs, and how much more inconceivably subtile must those effluvia be which are exhaled from the body of such an animal.

Extent of these Effluvia.

The extent to which effluvia may pass from their original source, will very much depend on their particular nature; nor is their extent less wonderful than their minuteness.

If half a grain of very pure gun-powder, for instance, be laid on a piece of tile, a glass vessel placed over it, and the gun-powder fired, the smoke will fill the whole cavity of the glass, though its base were eight inches, and its perpendicular height above twenty. The space to which in this case the smoke reaches would exceed five hundred thousand times that which contained the unfired powder.

It is also well known, in those countries which produce cinnamon, that the odour is often smelt at an immense distance from its source. It has been actually perceived twenty-five miles at sea, from some of those islands in which the plant is produced. And it is well known, that when substances have been affected by those effluvia, the length of time during which these perfumes may exist, without any fresh addition from the odorous substance, is truly astonishing. Gloves, and many other perfumed articles, have been known to retain effluvia twenty-eight or twenty-nine years, and probably they retained them many years longer. We therefore cannot but conclude, that those odorous emanations must be unimaginably subtile, which could for so long a time issue in such quantity from substances, and yet leave them completely impregnated with particles of the same nature.

Little loss sustained by Bodies in consequence of Effluvia.

Independently of odoriferous particles thus constantly emitted from certain bodies, the diminution in their weight is extremely small. If a lump of assafœtida be suspended in a pair of exact scales, which turn with a very small part of a grain, and be allowed to stand in them for a considerable time, it will not sustain any discernible loss of weight, though it have about it an atmosphere of fœtid exhalations.

Effluvia, or Vapour of Water.

Evaporation from water is greatest when such water is at a higher temperature than the air, and least when the air and water are precisely at the same temperature. After a hot summer's day, rivers, canals, ponds, &c. if fully exposed to the sun, are heated to seventy degrees; and the cold air which descends on us in a calm night is frequently cooled below fifty: The difference of temperature being then thirty degrees, the rivers, canals, &c. smoke like a boiling caldron, and the vapour is seen hovering over them, till after sun-rise, and again late in the evening.

Rivers probably give out more vapour in proportion to the surface exposed to the air than the sea; for we find that pure water boils at 212 degrees; whereas sea water requires to be heated to 223 of Fahrenheit.

Effluvia of Mineral Bodies.

The evaporation in more dense substances must evidently be slower. Walls, for instance, in some houses built of stone and lime, do not, for forty years, and often more, acquire that solidity which they can alone attain by the emission of effluvia. It is also well known to those who are employed in the fusion of metals, that not only lead and tin, but much harder bodies, emit copious and hurtful steams; and there are of these some kinds of which the smell is so strong that smiths can scarce endure to work them. Nearly the same is the case with brass and copper when strongly heated.

Although the most dangerous evaporations from these mineral bodies are most frequent in mines, pits and other subterraneous places, yet they are sometimes met with on the surface of the earth, especially in countries productive of minerals, or pregnant with embowelled fires, such as Hungary and Italy.

Effluvia of Vegetables

With respect to vegetables, I may remark, that while living they alter their temperature very slowly and difficultly; but the evaporation from their numerous surfaces is much greater than from the same space of land uncovered by vegetables. Dr Hales observes, that tracts of land covered with trees or vegetables, emit more vapour than the same space covered with water; and Mr Williams found the surplus to amount to $\frac{1}{3}$.

Dead vegetable matter, such as the wood of musical instruments of different kinds, requires, after it has been cut, twenty, forty, and in some instances fourscore years, before it acquires its full seasoning.

Effluvia of Animals.

With respect to animal effluvia, I may mention, that in every instance, even where the more exhalable parts, as in eggs, shell-fish, &c. are closely covered, they grow lighter.

When a partridge, hunted deer, &c. have casually set a foot upon the ground, that part where the foot-step has been (though invisibly) impressed, continues for many hours a source of emanations.

Effluvia both from Vegetables and Animals in consequence of Putrefaction.

Those vegetable substances which, while entire, are most soluble in water, are most liable to putrefaction. Oils, resins, &c. are consequently least liable to it. Though heat be necessary to this process, that which is not sufficiently great to dissipate humidity, most accelerate it, and air uniformly promotes it.

When watery particles soak into and disunite the particles of vegetables, their repelling power is thereby rendered superior to their attracting power, and the union of their parts is thoroughly dissolved.

Mr Cruickshanks collected a quantity of that gas which is propagated during the summer months in marshy places, and which may be readily separated by agitating the putrefying vegetables. On examination, he found it to be oxycarbonated hydrogene gas, formerly known by the name of heavy inflammable air. This air is more destructive to animal life than any of the other gases; for when mixed with twenty times its volume of atmospheric air, and inhaled into the lungs, it produces sickness, vertigo and fainting. Any other of the gases may be breathed with impunity, upon being mixed with four or five times their volume of atmospheric air. This gas being very little lighter than common air, nearly in the proportion of 2 to 3, is also more likely to be preserved in combination with it till it produces its deleterious effects, than the pure hydrogen gas, which is about 13 times lighter than it.

Dead animal substances unexposed to the action of atmospheric air, decay very slowly, and, when immersed under water, are changed into a substance of a fatty nature, having nearly the properties of spermaceti. The admission of air and moisture to these substances causes them on the contrary to putrify; a heat from 60 to 80 of Fahrenheit is that which most promotes it, and by intense cold it is entirely checked.

It is observed, that in countries where there is great heat and little moisture, such as Peru, Egypt, &c. dead animal substances may be kept a long time without putrefying.

Various highly respectable authorities may be adduced in favour of animalcula producing putrefaction; while others with more probability assert, that it is, on the contrary, from putrefaction that the animalcula arise.

Dr Macbride endeavours from experiment to prove, that fixed air is the cementing principle or bond of union which connects the ultimate particles of bodies to each other, and prevents them from running into a state of putrefaction, to which all animal and vegetable substances have a natural tendency, and at which, according to him, they arrive with more ease when divested of this principle.

Alexander admits, that at such a time a change in the substance takes place; but he does not think that change to be putrefaction; and, in order to prove this, he shows by experiment that fixed air may be separated from bodies without their becoming putrid; and that fixed air, added to putrid substances, has no effect in rendering them sweet; and further, that substances do putrefy without their fixed air being allowed to escape from them.

The evident conclusion from this is, that the loss of fixed air is only a circumstance attending the putrefaction of bodies, and by no means the cause of putrefaction.

Manner in which these Effluvia exist in the air.

These different effluvia may exist in the air quite independently of heat, or at least of greater heat than the common temperature of our atmosphere; and it cannot be doubted, that even at that very moderate temperature, certain changes in the texture of the hardest bodies takes place, rendering them sufficiently volatile to float in invisible particles in the common atmospheric air.

These substances remain in the air in the same way that different salts remain in solution in water. Now, as the suspension of the particles of water in air, of salt in the waters of the ocean, and of other heavy bodies in fluids that dissolve them, seem to be phenomena of the same kind, we may reasonably suppose that they arise from the same cause, and that what we call evaporation is nothing more than a gradual solution of water in air.

Dr Halley observes, that evaporation is vastly promoted by agitation, which continually brings fresh particles of the aerial fluid into contact with the body it dissolves, in the place of those that have been already saturated. In cold weather, it is observed, there is not so copious and continual an evaporation of water in particular, and therefore the air is then generally clearer than in hot weather. Still, however, there is at all times some degree of evaporation; and the lower part of the air being pressed, by the weight of the atmosphere, against the surface of the water, is thereby enabled to attract and dissolve the particles with which it is in contact, and to separate them from the rest of the mass. Since, therefore, the cause of solution is in this case the stronger attraction of the particles of water to air than to each other, those that are already dissolved and taken up will be still further raised by the attraction of the superincumbent dry air, and will thus diffuse themselves, still gradually rising higher and higher, and rendering the lowest air less saturated, so that it will still be able to dissolve and take up fresh particles of water. Thus ice or snow will evaporate as well as water, its particles being attracted and dissolved by the air, which is strongly pressed against its surface.

Now, though vapours are first raised, and abound most in the lower parts of the atmosphere, yet they cannot there form clouds, because the heat that aided their solution, contributes to keep them in the same state. But when they are carried by winds into the higher parts of the atmosphere, where the same heat is wanting, the cold air is not able to hold in solution the whole of what is carried up, but suffers some of it to coalesce into particles, which slightly attracting each other, and being intermixed with air, form clouds, having the very same appearance with steam, which consists of small particles of water, *mixed* with air, and not *dissolved* in it.

In illustration of this, we must all have observed, that in a hot summer's day, the air over wet marshy ground is copiously filled by aqueous vapours, but growing cooler after sun-set, it is not able to hold all these vapours in solution, but permits some part of them to unite into very small visible particles, and form those mists which appear to rise from marshy ground in a summer's evening.

In some places the earth gives out hot vapours, which rise by their elasticity, and carry with them mineral and fossile particles of different kinds. Fermentation generates elastic vapours, which expend themselves in the air. The particles of water, also, and other fluids, when sufficiently heated, acquire a repelling force, which at once separates them from the surface, and from each other, and throws them upwards into the air. But all these vapours soon lose that elasticity by which they were at first liberated and raised, and then they must be held suspended in the air by the same power which supports those vapours that rise without elasticity in common evaporation.

Effects of Effluvia.

In illustration of the effects of effluvia, I may observe, that not only less land floods, that overflow contiguous fields, but even those terrible inundations which sometimes cover whole countries, are composed of particles singly so inconsiderable as drops of rain when they continue to fall in those multitudes we call showers.

Thus, also, accumulated masses of such minute bodies as grains of sand, being heaped together in sufficient numbers, make banks, by which the largest ships are sometimes split; nay, it is justly observed, that it is these banks which in most places serve as boundaries for the sea itself.

Thus, also, though a single grain of gunpowder, or even two or three together, have not force enough to do much mischief, yet two or three barrels of these grains exploding together, are capable of blowing up ships or houses, and of performing prodigious operations.

Effluvia being of different kinds, and consequently capable of producing different effects, we shall commence by making a few observations on the simple evaporation of water, and its effects on different substances, and then proceed to those of more noxious qualities.

Watery effluvia, simply considered, have little, if any, bad effects on the health of individuals; but it is pretty well ascertained, that its general effects on the climate are often remarkable. In woody countries, where a great evaporating surface is presented to the air, the climate is colder than in those that are open and cultivated; and a change of this kind being made in the surface of countries, the climate is altered considerably in its nature. In Guiana this circumstance is strongly marked; for part of that country has been cleared from wood only about a century, and the heat in that part is already excessive; whereas, in the woody parts of the same country, the inhabitants are obliged to make fires every night.

Draining of land, fallowing the ground, the formation of wide turnpike roads, and similar improvements on the soil, tend to ameliorate the climate; but artificial irrigation, artificial rivers, ornamental lakes, floating docks, &c. by increasing aqueous surface, increase the disposition to cloudiness, and consequently to coldness and humidity.

A thermometer hung over a damp piece of ground, during fogs or exhalations arising from it, will often indicate a degree of cold below the freezing point, which can only be produced by watery evaporation.

The chillness of the body, so sensibly perceived when in this situation, seems to proceed from the same cause, and to produce nearly the same sensations which the damp floor of a chamber communicates to those who happen to continue in it whilst in that state.

The effect of aqueous vapours on different kinds of wood, even of the hardest texture, is remarkable. Even where seemingly little exposed to its influence, as in windows, doors, &c., they are often enlarged in size in an extraordinary degree; and this being continued for a considerable length of time, they rot and fall to pieces.

In consequence of the particular moisture of certain climates, as that of Ireland, it has been observed, that the annual crops are much inferior to ours in every respect, even in the same season; the general weight of Irish grain being about 48 pounds to the Winchester bushel, while that of England has weighed 52 or 53 pounds in the same season.

To this moisture of the climate has been imputed the absence, in the same country, of various reptiles, where it is a tradition, that if poisonous creatures have been carefully brought there from other parts, they have died almost as soon as they came thither. There are some other islands to which a like hostility to such animals is ascribed.

The effluvia from mineral bodies is more generally destructive than those which we have now considered.

The well known grotto del Cani, in Italy, is remarkable for the noxious quality of its vapours. A lighted torch goes in a moment entirely out when immersed in it, and a pistol cannot be fired in it.

It has been observed, that pectoral complaints in this country have increased in number since we ceased to use wood fires, and, on the contrary, adopted more generally the plan of burning mineral coal.

The effects of effluvia in laboratories have often been experienced by chemists. Those of sulphur, antimony, arsenic, and several other minerals, unless great care be taken in unluting the vessels in which they had been distilled or sublimed, make them stagger; and have been known even to strike them down.

Sennertus relates, that a painter, on opening a box where orpiment, which is used as a pigment, had been long kept, had his face swelled, and was thrown into fits.

Mr Boyle also relates the story of a young man, who having heated himself in a tennis-court, with an amulet containing arsenic upon his breast, the virulence of its particles made him fall down dead upon the spot.

The effluvia from burning charcoal also produce very prejudicial effects; for we have many instances of persons, who, by lying for a night exposed to them, have been the next morning, or sooner, found dead in their beds.

That various bodies of a poisonous nature may exercise such operations upon others by their effluvia transmitted through the air, as they do by their gross substance, is a truth of which we have some examples among medical writers.

Even medicines, which are of a milder nature and operation than poisons, are capable in some cases of producing by their effluvia similar, though less powerful, effects than they are known to have when in substance. Sennertus affirms, that some persons will be purged by the very odour of colocynthis.

The mortal effects of subterraneous damps in mines, deep wells and similar close places, as also of the fumes of confined burning charcoal, may be accounted for in the same way, these being generally deleterious exhalations from mineral substances.

We likewise find that vegetable effluvia are possessed, in many instances, of very noxious effects.

Nothing, for instance, is sweeter than a rose, and yet its fragrant effluvia are far from being favourable to the air in which it is confined. Some, to whom the smell of that flower is not unpleasing, are nevertheless so much hurt by it, that it makes them sick, and would make them even swoon, if not seasonably prevented.

It is observed, that on breathing for some time in a conservatory, where the floor is kept moist, and a number of luxuriant vegetables are growing, there is felt a fullness, with sometimes a giddiness, in the head, and some debility; but if we put our head out of the window, or inhale the atmospheric air from without, through a tube, the unpleasant sensation subsides, although the rest of the body be exposed to the warm and humid air.

The examples I have given of the noxious effects of vegetable effluvia on the living body, are, I think, satisfactory. In addition to them, it is a very remarkable circumstance, that there are some even of plants which do not thrive in the neighbourhood of others. This is observed of the cabbage and cyclameus, of hemlock and rue, of reeds and fern. We have also many examples of such like antipathies among animals. These effects are of course produced by the effluvia which are emitted by all organised bodies.

It seems pretty well established, that marshes of a boggy sort, or where the soil consists of peat, are not prejudicial to health;

and moss of itself is not easily corruptible, and has even the power of preserving animal and vegetable substances for ages. What therefore we understand by putrid substances is of a very different nature from this; and and where exhalations from marshes prove prejudicial to the health, it is probably owing to the innumerable vegetables and insects that die and putrefy in them.

After heavy rains, in many countries, a very dangerous moisture of the air arises, particularly where the water after land floods stagnates and corrupts in low grounds; but otherwise, in the flattest grounds, if properly drained, frequent showers have a salutary effect in tempering the heat, refreshing the stagnating water, and precipitating putrid exhalations.

On the contrary, stagnant waters, and even large rivers, in dry seasons, produce very bad effects. When a great part of their channel is left uncovered, its moisture is totally exhaled, it becomes a hard and solid crust, and no sooner do the rains fall, than gradually the long parched crust of earth and clay softens, and the ground, which before had not the least smell, begins to emit a stench, which, in a short time, becomes exceedingly noisome; and then, in every country where such occurrences are common, the season of sickness commences.

In the day time, these swampy shores emit a smell resembling that of corrupted flesh, or putrid carrion; and a near approach to such putrid swamps is then apt to produce an immediate sickness, a vomiting, and afterwards a low nervous fever.

The smell of the swamps, and of the vapour arising from them, at this time, resembles the unwholesome scent of a ditch lately cleaned. And the effect upon the most healthy and vigorous constitution is often the chilling cold fit of an ague, terminating in a fever, with delirium, bilious vomiting, a flux, or even death itself.

It has even been observed, that certain periods of the year in every country are more unhealthy than others, and an explanation of this has been attempted in various ways by medical writers.

It has, I believe, been pretty generally acknowledged, that in this country the prevalence of disease is most conspicuous in spring and autumn, but that the diseases of spring are milder than those of autumn. Among other modes of accounting for this, it has been supposed, that the difference in the severity of the complaints in spring and autumn is owing to the different effects produced in the constitution by the season previous to each. Thus, it is said, that the bracing effects of winter render the diseases of spring milder, and the relaxing effects of summer, on the contrary, make the autumnal diseases more severe.

Perhaps it is possible to give a more satisfactory explanation of these occurrences. Is it not more likely, that the remarkably sudden changes of the weather in this country render the spring months unwholesome; and that, on the other hand, the putrid effluvia arising from decaying vegetables about the harvest time, are the principal causes of those diseases which are so very common, and so very destructive at that period?

It is a well known fact, in those countries where lint grows, that if the process of *steeping* be carried on in a running stream, the fish, &c. farther down the river, to a very considerable distance, die almost immediately on the impregnated water reaching them.

In England

Many years ago, there broke out, amongst the scholars at Wadham College, a very malignant fever, that swept away great numbers, whilst the rest of the colleges remained unvisited. The singularity of the case engaged the attention of all the gentlemen of the faculty, in a serious inquiry into the causes of so remarkable an effect; and all agreed, that the contagious infection arose from the putrefaction of a vast quantity of cabbages thrown into a heap out of the several gardens near Wadham College. The noxious effluvia arising from such putrid fermentation mixing with the air, had consequently power to infect the adjoining building, though not to pass farther.

Now, it is to be observed, that all alkaline plants, such as cabbage, turnips, raddishes, &c. when in a putrid state, come nearest to that of the animal corruption.

In the hundreds of Essex, where the country lies low, and the soil is continually moist and spongy, it is well known the marsh miasmata, perpetually ascending, determine the fever, produced in consequence of cold, to be an intermittent. The fevers of North Wales, and the northern countries of Europe, on the contrary, are, in general, inflammatory, though cold be still the existing cause; the atmosphere being there and dry.

In short, in all low grounds, such as Holland, &c. &c. where the soil is continually moist, equally bad effects result from it. In Holland.

Among those troops which were sent to the continent about fifty or sixty years ago, that circumstance was particularly remarkable. Whilst the days were sultry, and the nights cool and foggy, it was remarked that several of the men of those regiments which lay nearest the inundations were seized at once with a burning heat, and violent head-ache, some previously feeling a short and slight chillness, others mentioning no preceding disorder. They complained besides of intense thirst, aching of the bones, a pain of the back, great lassitude and inquietude; frequently of nausea, sickness, or pain about the pit of the stomach, sometimes attended with vomiting of green bile of an offensive smell. There were several instances of the head being so suddenly and violently affected, that, without any previous complaint, the men ran about in a wild manner, and were believed to be mad, till the solution of the fit by a sweat, and its periodical return, discovered the nature of the delirium.

In Rome. When the marshes about Rome were more numerous than they now are, that place and its neighbourhood was very unhealthy. It has, since these changes took place, become much more healthy.

There are not less than fifteen plagues mentioned by Livy; which yet, from other circumstances, appear to have been only so many malignant and destructive epidemics, occasioned by the putrid effluvia from the neighbouring marshes. But even when drains and common sewers were made, Rome became more healthful, and then only the low and wet places of Latium remained sickly.

Lancisius, too, at a much later period relates, that thirty gentlemen and ladies of the first rank and distinction in Rome, having made an excursion, upon a party of pleasure, towards the mouth of the Tiber, upon the wind suddenly shifting, and blowing from the south over the putrid marshes, twenty-nine were immediately seized with a tertian fever, one only escaping.

In Bassora.

In Asia, the Arabs, in order to conquer their enemies, break down the banks of the river at Bassora, in order to cover the neighbouring deserts with water; and having thus inundated its environs, the stagnating and putrefying water in the adjacent country, and the great quantity of dead and corrupted fish at that time lying upon the shore, pollute the whole atmosphere, and produce a putrid and most mortal fever.

In Sumatra

In Indrapour, in Sumatra, no European, during the rainy season, can sleep ashore one night without hazard of his life; and at Podang, in Sumatra, it is called the Plague Coast. Here a thick pestilential vapour or fog arises after the rains from the marshes, which destroys all the white inhabitants.

In Java.

The Dutch, in endeavouring to make their capital in India to resemble their cities in Europe, have adorned it with canals or rather ditches, intersecting each other, and running through every part of it; and these, in the hot and unwholesome climate of Java, during and after the rainy season, become extremely noxious to the inhabitants, but more particularly to strangers. The unwholesome air of that place alone has cut off more Europeans than have fallen by the sword in all the bloody wars carried on by the Dutch in that part of the world.

In Egypt.

Some writers, who have attempted to account for the origin and cause of the true plague in Egypt, do not seem to be well acquainted with the nature of its winds and seasons. Were it not for the inundation of the Nile, this country, in all probability, would have been rendered uninhabitable during the summer months, not on account of the filth of Grand Cairo, but for another reason, viz. the hot winds from the deserts, which often begin here in the middle of April, and continue to blow for 30 or 40 days. The heavy dews which then fall in the night serve in some measure to refresh the air; but when, by the increasing heat of the summer, the samiel winds have acquired a pestilential violence, and the most destructive quality, then a sheet of water is, by the hand of providence, spread over Egypt.

Prosper Alpinus observes, that the stagnating canals at Grand Cairo breed every year a malignant kind of small pox. He also remarks, that the pestilential fevers are both epidemic and fatal at Alexandria in autumn, after the recess of the Nile.

The lower part of this country being rendered unwholesome by the annual inundation of the Nile, and being surrounded on three sides by large and extensive deserts of sand, is thereby exposed to the effects of the noisome vapour, which, during the summer months, arises from hot sultry sand.

Now, there does not seem to be any thing peculiar in the air or climate of Egypt more favourable to the generation of the plague there, than in many other countries where it is unknown. There are many parts of Africa and America, which, in common with Egypt, are subject to inundations; where the climate is extremely hot, and the ground marshy and covered with wood; and in those countries, (naturally more unwholesome than Egypt,) the plague, so far as we can learn, is not generated without contagion ; on the contrary, in most of those countries it is wholly unknown. We must consequently ascribe it in general to the soil, and to the filth of the inhabitants.

In Ethiopia

In Ethiopia, those prodigious swarms of locusts, which at times cause a famine, by devouring the fruits of the earth, unless they happen to be carried by the winds clear off into the sea, are observed to entail a new mischief upon the country, when they die and rot, by raising a pestilence.

In Guinea.

The most mortal epidemic in Guinea is that low malignant fever, of the remitting kind, which rages only in the wet season. The dry belly-ache is the same disease there as in the West Indies ; but the Guinea worm seems in a manner peculiar to Africa. It has also been supposed to proceed from a bad quality in the water of the country, which is in general owing to the woody and marshy soil.

At Whydaw:

Dr Lind, in his Essay on Diseases incident to Europeans in hot climates, observes, that the English castle at Whydaw is reckoned more unhealthful than the neighbouring places, as the sea breeze in coming to it always passes over an inconsiderable brook of water, which produces some aquatic plants, always covered with a putrid slime.

Cayenne has proved very sickly to the French; and they prefer the air of Martinico to that of St Domingo. At Guadaloupe, Martinico, and in most of the other French West India islands, there are low swampy grounds, commonly called Basse Terre, which are parcelled out to such poor and indigent foreigners as will run the risk of their health and lives, in improving them.

In the Basses Terres of the French West India Islands.

A large and commodious hospital was several years ago built in Jamaica, which, from its grandeur, was called Greenwich Hospital; but, in consequence of an adjoining marsh, sickness was often protracted, and never cured in it, and it was at last found necessary to abandon it, and all the sick soon recovered when taken out to sea.

In Jamaica.

These instances clearly prove the truth of the doctrines which I have advanced.

In consequence of its having been found by experiment that animal substances are preserved for a greater length of time in putrid vegetable matters, or in infusions of these substances, it has been supposed they could have no very great share in producing disease on the living fibre. It ought to be observed by those gentlemen who make such experiments, and who draw such conclusions from them, that it is highly probable that these substances produce very dif-

Particular action of these Effluvia.

ferent effects on the living from what they may do on the dead animal body; and likewise, that there is probably a very great difference of action produced on living bodies by exposing them to the effluvia of putrefying subtances, from what is produced by immersing them into the substance of putrid materials.

It has been asserted, that even were the effluvia from marshes, or those which are generated in mines, the cause of diseases of different kinds, the men employed in draining the one, and in digging in the other, would suffer more from them than they do. If, however, we reflect how completely a person may from habit acquire the power of resisting the noxious effects even of the strongest poisons, and of effluvia of the most destructive kind, we shall easily be able to account for these exceptions.

That pure water does not injure air, either in the form of vapour, or otherwise, is, I think, sufficiently evident. For, were moisture alone capable of producing disease, Ireland would be more unhealthy than Egypt, the former being a very wet, the other a very dry soil; but this is, by no means, the case.

It now almost amounts to a demonstration, from the accurate observation of Dr Lind, and others, that the vapour arising from wet, marshy soils, acts on the human body as a specific contagion, and not merely as producing cold.

In dry gravelly grounds of large extent, the dew is entirely water, and usually invisible: while that which arises from standing waters, morasses, bituminous earths, or places abounding with the exhalations of putrid bodies, must have various substances in it, and must often be pernicious to health.

The miasma, says Cullen, so universally the cause of fever, is that which arises from marshes or moist ground, acted upon by heat. The similarity of climate, season, and soil, in the different countries in which intermittents arise, and the similarity of the diseases, though arising in different regions, concur in proving, that there is one common cause of these diseases, and that that is this marsh miasma.

What the particular nature of this miasma is we, know not; nor do we certainly know whether it differs in kind; but it is probable that it does not, and that it varies only in the degree of its power, or perhaps in its quantity in a given space. We must not, however, consider marsh effluvia as the universal cause of intermittents, since it is found, that persons constantly residing in the most healthy parts of the metropolis are sometimes affected by them.

That marsh effluvia, however, in whatever particular way they may act, in general produce disease, seems very evident. Exhalations, also, from cavities in the earth being thrown open by earthquakes, which expose to the action of the air, minerals, &c. from which noxious effluvia proceed, produce similar effects.

In considering the perpetual changes which bodies thus undergo, whether they be mineral, vegetable, or animal, we cannot help admiring the celebrated fable of the Greeks, which so beautifully expresses the doctrine of these changes from inorganic to organic existence, and which has, of late, been so elegantly described by a poet of our own :

“ Hence when a monarch or a mushroom dies,
A while extinct the organic matter lies;
While nature sinks in time's destructive storms,
The wrecks of death are but the change of forms;
Emerging matter from the grave returns,
Feels new desires, with new sensation burns;
With youth's first bloom a finer sense aquires,
And loves and pleasures fan the rising fires :—
So erst the sage with serentific truth,
In Grecian temples taught th' attentive youth;
With ceaseless change how restless atoms pass
From life to life, a transmigrating mass;

How the same organs, which to-day compose,
The poisonous henbane, or the fragrant rose,
May with to-morrow's sun new forms compile,
Frown in the hero, in the beauty smile."

SECT. II.—*Of Climate.*

Composition of the Atmosphere.

THE atmosphere, or that azure coloured fluid surrounding the earth to a great height, and diminishing in density as it recedes from its surface, may, in one point of view, be considered as a collection of all the substances constantly disengaged by the processes carrying on at the surface of the earth, and existing in the aerial form at its mean temperature. These are mixed with various substances which they hold in solution.

Where the lower atmosphere is not altered by combustion, vegetation and respiration, by exhalations from subterraneous chemical processes, or bodies undergoing putrefaction, and similar local causes, if one hundred cubic inches are confined and examined, 27 or 28 are found to be oxygen, and the remaining 72 or 73 to be azotic air.

Other experiments indicate, that common air consists of nearly 21 parts of oxygen, and 79 of azote, which has been supposed to be more correct than the former, as examined by Scheele and Lavoisier, their methods of examination not being susceptible of precision.

Further, it does not seem that atmospheric air is altered in its composition from whatever height it may be brought for examination; for Lussac examined air brought from the height of more than 21,000 feet above Paris, and found it precisely the same as the air at the earth's surface. Air, when examined by De Marti's Eudiometer, is found to be similarly diminished. Under whatever circumstances the experiments are made, in whatever part of the world it may be examined, no variation is observed, whether the wind be high or low, or from whatever quarter it blows; whether the air be moist or dry, hot or cold, at whatever time of the day or night; or whether the barometer be high or low. Neither the season of the year, nor the situation of the place, its vicinity to the sea, to marshes, or to mountains, make the slightest difference.

The generality of modern chemists are of opinion, that the component principles of atmospheric air are what they term chemically combined. They, at the same time, allow, that, independent of this combination, it possesses no qualities *different* from those of its constituent parts, nor do they appear to be altered further than by mere dilution, as these constituents mix equally well, and remain diffused through each other, in every possible proportion; nor is a change of temperature observed as an indication of any chemical action between them.

Mr Dalton has proposed a mechanical theory of the constitution of the atmosphere on the principle that it is merely a mixture of the azotic and oxygenous gases of which it is composed, which accounts for the fact apparently irreconcilable with the chemical hypothesis.

In support of their respective opinions, the chemical and mechanical philosophers have each exerted their ingenuity in accounting for the composition of the atmosphere. In opposition to Mr Dalton's theory, it has been supposed, from the phenomena of affinity, that an attraction *may* be exerted between substances, so as to unite them intimately, though it be insufficient entirely to overcome opposing forces; and they think, that a further assumption will not surely be regarded as improbable, namely, that this attraction *may* counteract the difference in the specific gravities of these substances, especially where it is not considerable, and prevent them from separating from each other.

The mixture of nearly one part of oxygenous air, and three parts of azotic gas, which forms the atmosphere, is the best proportion of ingredients for the maintenance of life; for we find that, with a smaller proportion of oxygen, not only respiration becomes unpleasant and laborious, but debility, convulsions, and other bad effects are produced; and, on the other hand, we find, that bad symptoms of exactly an opposite kind are brought on by a greater proportion of it, viz. a preternatural heat, increased pulsation, pain, inflammation, &c.

As there is a tendency constantly to destroy this regularity in the constitution of of the atmosphere, by the variety of changes which are continually going on at the earth's surface, so there is an equal tendency, by the same means, and by the changes also going on in the atmosphere itself, to repair its losses.

Thus, admirably, the omnipotent Creator of the universe displays equal omnipotence in beautifully counterbalancing the various operations of nature, and in preserving unimpaired the constitution and harmony of the whole.

The air, however, it is well known, is capable of uniting with a great variety of substances. Indeed, it never does appear in a pure state, but always has in it a considerable admixture of foreign bodies. Substances thus held in solution in the atmosphere often assume the elastic form, and among these some are the principle of odours: hitherto, however, these emanations have escaped chemical means, which, though they can destroy some, do not enable us to explain their nature.

Hence, we must conclude, that the atmosphere is a *chaos*, consisting not only of elastic, but also of unelastic substances, which, in great plenty, float in it, as well as of watery, saline and earthy particles, which are incapable of being thrown off in a permanently elastic form, like those particles which properly constitute the air. Thus, therefore, the air may be considered as the great instrument of nature, by which a general circulation of matter is maintained, and by which not only water is every where dispersed, but often the eggs of insects, and the seeds of plants, are conveyed from place to place. Both of these have been found in rain water, in examining it carefully just after it has fallen; and indeed we sometimes find insects and plants in some places where their appearance cannot be well accounted for, otherwise than by supposing their eggs and seeds to be conveyed by the air.

Mr Dalton is of opinion, that the presence of the atmosphere is an obstacle, not to the formation, but to the diffusion, of these vapours, a diffusion which he thinks would take place instantaneously, as in a vacuum, if the moleculæ of the air did not oppose it by their inaction.

Weight of the Atmosphere.

The weight of the atmosphere depends on its density and height. Where its weight is greatest, its height is least; and, on the contrary, where its density is least, its height is greatest. Now, it is supposed that this elastic fluid floats equally around our planet to the distance of at least 45 miles of perpendicular elevation. Upon the body of a man of middle stature, therefore, its weight is equal to 32 or 33,000 pounds; but in rainy and variable weather, and especially on the summit of high mountains, there is a diminution in its pressure of many thousand pounds.

It has been calculated, that the mean weight of the atmosphere amounts to about 11,911,163,227,258,181,818 lbs. avoirdupois. It is therefore 816 times lighter than water.

In Lavoisier's examination of the effects of the pressure of the atmosphere, opposed to the action of caloric, that philosopher remarks, that without it the moleculæ would be infinitely dispersed; and that nothing would limit their separation, did not their own weight in a manner collect them so as to form an atmosphere.

Temperature of the Atmosphere.

As the earth is the chief source of heat in the surrounding atmosphere, distance from the earth must be a source of cold; or, in other words, the greatest cold must prevail in the highest regions of the atmosphere; for heat is observed to diminish in ascending into the atmosphere, nearly in an arithmetical progression. Clear unclouded air seems to receive no heat whatever from the rays of the sun, whether direct or reflected.

The coldest weather, in every latitude, generally prevails about the middle of January; and the warmest weather, in all latitudes above 48°, during the month of July; but, in lower latitudes, August is generally warmest. Reckoning astronomically, the greatest cold ought to be felt at the latter end of December; and the greatest heat in the end of June; but the earth requires some time to receive, or to lose, the influence of the sun, in the same manner as the sea, with respect to tides, does that of the moon.

The following table from Kirwan shews the increase and decrease of the heat at Montpelier, which lies in lat. 43° 36′, long. 3° 73′ east. Its temperature from 1777 to 1781 was 60° 87′.

January	42°	21
February	45,	58
March	50,	09
April	57,	82
May	66,	51
June	72,	63
July	79,	06
August,	79,	33
September	71,	64
October	63,	22
November	51,	97
December	46,	48

The standard temperature is 59°; Montpelier is therefore 1.87 degrees warmer than the standard. Its distance from the Atlantic is 260 miles by which it should be cooled 1.6 degrees; but its temperature is governed chiefly by that of the Mediterranean, which, lying to the south of of it, in still warmer latitudes, communicates its temperature to it, during both summer and winter; winters, however, during which easterly winds from the mountains of Savoy and Piedmont prevail, must be much colder. The soil on which Montpelier stands, which is sandy and stony, must also much contribute to its heat.

That the temperature of the air, however, varies considerably, not only in different climates, and in different seasons, but even in the same place, and during the same season, must be obvious to the most careless observer. This perpetual variation cannot be ascribed to the direct heat of the sun: for its rays, though ever so much concentrated, seem to produce no effect whatever upon air; they therefore merely warm the surface of the earth, which communicates its heat to the surrounding atmosphere.

It seems undoubtedly owing to the different degrees of cultivation in different countries that we are to attribute the alteration which has sometimes taken place in their temperature. As an example, we may mention the northern countries of Europe, which are far warmer now than they were nearly 2000 years ago; for though Italy, for instance, might have been as well cultivated then as at present, yet Germany was covered with woods, and consequently the winds that passed from it to Italy were far colder.

The effects of these different states of cultivation may thus be felt at an immense distance. We know that Siberia is 2800 miles to the east of London; but, according to the computation of Mr Smeaton, a common high wind moves at the rate of 35 miles an hour, and therefore may pass thence to us in three days. Now, Sir Charles Blagden has shewn, that a current of 20 leagues in breadth, and ten degrees warmer than the ocean, through which it flows, may preserve four degrees of its heat, after it has traversed a space of 7 or 800 miles. And Sir Benjamin Thomson has proved, that air is a much worse conductor of heat than water; therefore we may well suppose, that the Siberian winds may preserve much of their original temperature on arriving here; particularly if they blow with considerable force, and last during some days.

Many proofs may be adduced of the effects of cultivation on climate, but I need only remark, that even the uncultivated parts of America are at present much more temperate than they were a century ago; and doubtless, when that country is still further cleared of woods, its climate will be still further improved, though, from the situation of the high lands, it can never be so moderate as that of Europe.

I may finish this part of the subject by observing, that the drying effects of the atmosphere are owing to its heat, which causes the watery vapours contained in bodies to ascend.

Winds. It is the change of temperature that chiefly occasions the vicissitudes of winds; these in their turn, however, influence temperature.

The effects of the winds in our temperate climate are, comparatively speaking, scarcely felt. On the coast of Africa, on the contrary, the winds blow so very hot from the land, that they can be compared to nothing but the heat proceeding from the mouth of an oven; and they also bring with them a smell that is quite intolerable. Some of these terrible winds are of so drying and hot a nature, that the wolves, tigers, lions &c. go to the rivers, and lay their whole bodies under water, leaving only their nostrils above it for the purpose of breathing. The birds, likewise, soar to an immense height, or fly a vast way over the sea, where they continue until the wind changes to the west.

Vapours and Rains.

A general cause of humidity in the atmosphere is imperfect ventilation. Where, for instance, there are no hills to direct the winds in streams upon the lower grounds, the air is apt to stagnate; particularly if there exist in the same place large plantations.

I know not what credit is to be given to an assertion which I have seen in some works, that the east wind in England not only uniformly brings with it a fog from the sea; but that this wind, in many places of the island, frequently raises a copious vapour from water, mud, and all marshy and damp places, thus possessing an exhaling quality.

With respect to vapours in the atmosphere, the higher regions contain less than the strata near the surface of the earth. Saussure and Deluc mention many striking proofs of this.

Vapours thus floating in the air are precipitated by rains descending from colder regions. In this way, the atmosphere is refreshed by showers, and in temperate climates, immoderate exhalations from the earth are thus prevented. Sir John Pringle observes, that the most healthful campaigns have been those in which the heat and moisture of the air were thus moderated by frequent showers.

In marshy grounds, intense and continued heats, without rain, occasion the greatest moisture of the air, by the exhalations they raise and support in the atmosphere; whereas frequent showers, during these hot seasons, cool the air, check the excess of vapour, dilute and refresh the corrupted water, and precipitate the putrid and noxious effluvia.

Supposing that the mean annual quantity of rain for the whole globe is 34 inches, as the superfices of the globe consists of 170,981,012 square miles, or 686,401,498,471,475,200 square inches, the quantity of rain annually falling will amount to about

23,337,650,812,030,156,800 cubic inches, or somewhat more than 91,751 cubic miles of water.

Climates most favourable to health.

It seems universally allowed, that in every country hot-dry and cold-dry weather are, of all others, the most healthy.

Fernelius relates, that near the time he wrote, one year was throughout the world immoderately hot, and was yet strikingly healthful. He also reports the plague to have begun in the midst of winter, and to have gone off in summer, and observes, that hot summers have often been altogether free from it.

That hot-dry weather certainly is unfavourable to the propagation of contagion, is a fact well ascertained by writers on epidemical diseases, and unanimously maintained by those who treat of the diseases of tropical climates.

As an instance of a moderate climate, we may adduce the Canaries, which are blessed with a temperate, pure, and wholesome air. No sooner are sick persons landed there, than they find an immediate and satisfactory alteration in their health.

In the island of St Helena, also, the English planters retain their health, complexion, and vigorous constitution, during all the seasons or the year, and live to as great an age as in Europe.

Hence, it would appear, that those countries most productive of diseases are such as are warm and moist, cold and moist, or subject to sudden and great alterations of temperature.

Alterations produced on the Atmosphere.

The quality of common air is not altered by merely heating or cooling, or by being for a time loaded with the vapour of water, nor by rarefaction or condensation. It is contaminated principally by combustion, by the fermentation and putrefaction of animal and vegetable bodies, by the calcination of metallic substances, by the presence of vegetables when they are not under the influence of the sun's rays, by respiration, and by the admixture of every other gas, or permanently elastic fluid, except oxygen.

Thus, by these operations constantly carrying on at the surface of the earth, atmospheric air is suffering constant changes; its oxygen is consumed, and carbonic acid, and various other gases, are disengaged and communicated to it.

Alterations caused by Vegetation

That all living matter possesses or generates heat in a certain degree, is, I believe, pretty generally acknowledged. Of this we have numerous and incontrovertible proofs, not only in the animal, but in the vegetable world.

The sudden thaw of snow lying on grass, while that on adjoining gravel continues unthawed; the fact of the moisture of dead sticks freezing, while the sap of growing twigs is not at all affected; and of herbaceous plants often resisting degrees of cold which freeze large bodies of water; all these seem to shew, that vegetables possess a power of generating heat.

During the process of malting, too, a considerable production of temperature takes place; so great, indeed, that, in certain circumstances, grain improperly kept has even taken fire. From this fact we conclude, that during the germination of seeds in the earth, a production of temperature likewise takes place.

Air is not only necessary to the growth of seeds, but the ordinary state of its composition is also the best adapted to produce vigorous germination.

Without it, then, plants do not vegetate, and as, even although air be supplied, they cease also to grow when deprived of leaves, we must conclude, not only that air is essential to the growth of plants, but that their leaves are the organs by which they inhale it.

It is thought by some, that the vegetation of healthy plants, growing in situations natural to them, has a salutary effect on the air. This certainly seems a very probable circumstance.

Dr Priestly, however, found, that whether the air had been injured by respiration, the burning of candles, or other means, it was not rendered better by vegetation, but worse; and the longer the plants continued in the air, the worse it became. This question is therefore still undecided.

Alterations produced by Respiration.

It appears that the atmosphere, as naturally composed, is best adapted to the economy of the animal system; but that this system is, at the same time, so constituted as to be able to bear great variations in the composition of the air, without immediate injury to life.

When, however, this variation proceeds to a certain extent, the air is no longer capable of supporting vital action; though different animals, when confined in given volumes of air, possess the power of prolonging this action in different degrees.

Borelli estimated the bulk of air taken in at a single inspiration at 15 cubic inches; Mr Kite, from 12 to 17; Dr Goodwyn at 14; Mr Davy from 13 to 17; Drs Turin, Hales, Haller and Sauvages, at 40 cubic inches. With the conclusion of these later authors, the experiments of Dr Menzies nearly coincide. Dr Bostock also thinks, that 40 cubic inches is the quantity of air employed in each ordinary act of respiration.

When atmospheric air is respired by animals, its bulk is diminished, and its qualities are altered. The diminution of bulk was noticed even by Boyle, who estimated it at about $\frac{1}{30}$ part of the air employed. Mayhow thought that it was reduced to $\frac{1}{14}$ of its previous bulk. In the experiments of Dr Hales, the degree of diminution varied from $\frac{1}{13}$ to $\frac{1}{30}$ of the air employed; and in these of Lavoisier from $\frac{1}{31}$ to $\frac{1}{60}$ part; with which the experiments of Goodwyn nearly coincide.

Even insects consume the oxygenous part of the air; carbonic acid is, at the same time, produced by them; and when all the oxygen has disappeared, these animals die.

These facts are now considered as proving, not only that the carbon, which decomposes the air, is furnished by the animal, but that its emission depends entirely on the state of the circulating fluids; for, as circulation increases, declines, or ceases, so likewise does the emission of carbon, and the consequent production of carbonic acid;

the oxygen gas cannot vary the result, being, in all cases, equally abundant.

In the several processes, then, of germination, vegetation, and respiration, it is evident, that, as carbonic acid is formed, the oxygenous portion of the air gradually and completely disappears; and that the acid produced bears always a constant proportion to the oxygen gas lost. It is therefore evident that these processes, by combining it with carbon, convert the oxygen gas into carbonic acid.

These alterations reducible to changes in the composition of the air, and changes in its temperature, density, &c.

All the alterations which thus result from these processes are reducible to certain changes in the composition of the atmosphere, and a great variety of others which may be produced in its temperature, density, moisture, &c.

Importance of considering their influence.

When philosophy had emerged from that darkness by which it had long been veiled, and natural causes began, of course, to be investigated, the atmosphere was naturally one of the first which attracted attention; and whenever diseases became epidemic, and no visible cause of this could be assigned, they were thought to derive their origin from certain mysterious qualities of the atmosphere. Though these opinions, like all those which at any time have tended to the improvement of science, had powerful opponents and powerful abettors, even yet they remain undetermined.

We are, however, instinctively taught to consider a pure air as one of the greatest sources of health, and an impure air as one of the greatest sources of disease; and to attribute to its various changes, and to the various particles which are continually floating in it, the causes of many of those widely spreading and mortal diseases, whose origin we cannot otherwise account for.

Whatever, therefore, the precise nature of these changes may be, the purity of the atmosphere has always been considered favourable to health in every age and situation of life. A pure air has also been esteemed favourable to the functions of the mind, so intimately connected with those of the body. Every one must from experience be satified of this beneficial effect of pure air upon the mental powers, and how greatly they are elevated and improved by it, while the unfavourable effects of an impure air on these powers must have been as evidently felt.

A general sickness may most certainly be produced by some latent intemperature of the atmosphere, the sources of which cannot easily be traced; neither is it always easy, from the sensible alterations in the air, as to heat, cold, and moisture, to account for the greater violence of endemic diseases in some seasons than in others. For oft

> "The all-surrounding heaven, the vital air,
> Is big with death. And tho' the putrid south
> Be shut; tho' no convulsive agony
> Shake, from the deep foundations of the world,
> Th' imprisoned plagues; a secret venom oft
> Corrupts the air, the water, and the land."

The causes, then, of all epidemics, as well as fevers, small pocks, dysenteries, &c. exist in that universal fluid—the atmosphere, of which, as our common food, we all alike share. These noxious miasmata may float in the atmosphere, sometimes in greater quantities, sometimes in less: and consequently produce their ill effects by proportional degrees of infection. Perhaps, also, their powers and operations may be heightened or depressed, according to the different states of the air. As either or both these causes prevail, we may justly suppose epidemics to appear with more or less rage and frequency.

I thus consider every degree of contamination that the atmospheric air is capable of suffering, as forming, from whatever cause it may arise, a source of disease. Habit will, doubtless, go a great length in enabling people to sustain, with apparent impunity, depravations of almost every kind; but this does not in the smallest degree lessen the truth of my assertion.

These deviations from the air's standard of purity may arise from various causes, and affect particular parts of the system according to the susceptibility of these parts in receiving, and their capability of supporting, diseased action. When parts are thus affected, either the whole body, or individual portions of it, mayexhibit proofs of the injury they have sustained.

The nature and severity of such diseases certainly depend, *1st*, On the nature and degree of change which may have taken place in the atmosphere. 2*d*, On the particular qualities of the foreign matter which may be combined with the atmosphere. And, 3*dly*, On the nature of the climate in which one or both of these changes may take place.

From certain states of the soil, as already observed, the strata of air successively applied to it may suffer very considerable change. In warmer, as well as in more temperate climates, these changes are continually going on. In warmer climates, however, their fatal effects are generally more speedy than in colder ones, where the unhappy sufferer is often doomed to drag out a long and miserable life, groaning under a slow, but gradually accumulating, load of diseases, which are nevertheless equally certain of terminating his existence, with those more speedy affections of warmer climes.

Modern chemists have endeavoured to prove by experiment, that the peculiar quality by which diseases are propagated, is not discoverable by them in their analysis of atmospheric air; they therefore believe it to be a quality of too subtile a nature to be detected in our present state of knowledge, by any chemical agent with which we are acquainted. In order to put this matter beyond doubt, they have analysed atmospheric air in every state, from its greatest purity to its utmost degree of contamination; and have found the component parts of it, in all the varieties of both these states, to be exactly the same. From these examinations, the above conclusion has been drawn. But if they had given themselves the trouble to recollect that putrid effluvia are not perhaps subject to the same laws with atmospheric air, and therefore can never be discovered by the same experiments, they would at once have seen the source of their mistake. The air of our atmosphere, therefore, is not, under these circumstances, vitiated in its qualities: an additional substance is added to it, not chemically combined with it.

Therefore, when we say that the air is pestilent, we do not understand that to be as it is of its own nature; for as such, it is not subject to putrefaction; but as polluted with noxious vapours arising from the earth, standing waters, vaults, &c. Now, certainly, among all the constitutions of the air, calculated to receive and disseminate pestilential effluvia, there is none more fit than hot, moist and still seasons. Its effects, therefore, in producing disease, must, for the most part, arise rather in consequence of additions made to it, than from any alteration in its constituent parts.

Thus altered, then, it would appear that different animals seem, from their peculiarity of structure, state of health, &c. to be differently affected by noxious effluvia, as different substances are capable of being differently affected by heat, moisture, &c.

It is also well known to surgeons, that different states of the atmosphere, contribute very greatly to retard or to promote the healing process.

Thus flesh wounds, simple fractures and dislocations, may be cured with almost equal ease in any situation, while violent contusions and burns, wounds of nervous and membraneous parts, compound fractures and the like, are rendered peculiarly dangerous and difficult of cure by contaminated air.

Diseases of a more general nature, too, are greatly influenced by particular states of the air. Whoever will, for instance, peruse the account of many campaigns, will see such a uniformity in the rise and periods of diseases, and these so much connected with the state of the air, as to be convinced, that neither the abuse of spirits, nor of fruit, nor the drinking of bad water, could have so considerable a share in producing them.

Therefore it is, in a great measure, to be imputed to the alterations our bodies undergo from the weather, in the several seasons of the year, that we are liable to such a diversity of distempers as often prevails amongst us. We must have observed, that when the season is very inconstant, a variety of complaints and confusion in their symptoms will ensue, according as various habits may be acted upon by such a mixture of impressions.

Foreign Bodies existing in the Atmosphere.

Having thus shewn the great influence which these circumstances have in the production of disease, I shall first proceed to point out the nature of the substances with which the air may be contaminated.

Here it necessary to distinguish;

1. The air which destroys, or rather which ceases to support life, because it is either altogether deprived, or too much impoverished of this elementary principle.

2. Air which is noxious, because surcharged with carbonic acid or carbonated hydrogen.

3. Air rendered odorous or fetid by emanations.

I have already pointed out the manner in which the air may be deprived of that portion which is necessary to support life, namely, by the processes of combustion, respiration, &c. and have now to proceed to the second kind of change produced upon it, namely, by the admixture of foreign bodies, by means of which it is rendered either directly or indirectly noxious to animal life. Among this class of substances, I must arrange water, although its effects in this way are far from being remarkable, there being at all times a certain quantity of it blended with the atmosphere.

Water.

With respect to evaporation, it is evident that the greater the extent of evaporating surface presented to the atmosphere, the greater must be the proportion evaporated. Upon this subject, if we are to believe Mr

Williams, the evaporation from the surface of land covered with trees and other vegetables, is one-third greater than from the surface of water; but this has not been confirmed.

In the present enquiry, it is unnecessary to examine this point particularly: I shall therefore merely mention, that water may be contained in the air in two states; in that of *solution*, and in that of *diffusion*; and it is the latter of these that we denominate a moist atmosphere. This vapour is held in solution by the air, precisely as one species of gas is by another. Hence the reason why it is so difficult to separate it, and why it is capable of undergoing a considerable degree of compression without assuming the form of a liquid.

The vapour of water is, like common air, an elastic invisible fluid, but lighter, being, to common air of the same elasticity, according to Saussure, as 10 to 14, or according to Kirwan, as 10 to 12.

To the formation of vapour, atmospheric air is not absolutely necessary, as that process cannot take place *in vacuo*.

Fixed Air. Fixed air, or carbonic acid gas is likewise often found in the atmosphere in considerable quantity.

Dr Hales shewed, that this air entered into the composition of innumerable bodies, and that it could likewise be obtained from them in various manners; that, with regard to gravity and elasticity, it had some affinity to atmospheric air; but differed from it in being totally unfit for respiration.

Priestly and Spallanzani proved, that during decomposition, animal as well as vegetable substances form carbonic acid, even in an atmosphere containing no oxygen. From these facts, it must be evident that immense quantities of carbonic acid must be constantly mixing with the atmosphere, in consequence of respiration, combustion, and several other processes which are continually going on.

This gas is insipid, and nearly inodorous, but eminently fatal to animal life. Breathed pure, it occasions immediate death; and even when diluted with 20 parts of atmospheric air, its effects are strongly and directly depressing; it reduces the force of the circulation, causes nausea and vertigo, and if breathed too long, suspension of the vital functions

With respect to the effects of fixed air on animals, I may observe, that those animals which have large lungs in proportion to their bulk, and which are formed to live in air, are soonest affected by it; thus birds have been found to die soonest in it; quadrupeds next; then amphibious animals, and lastly insects.

Carburetted Gases.

Several varieties of the carburetted gases exist, bearing, in their properties, a general resemblance, but still capable of being discriminated. The one which has been longest known, is that which is obtained when water is decomposed by charcoal at the temperature of ignition. It was discovered by Dr Priestly, who gave it the name of heavy inflammable air. In the new nomenclature, it has been named, from its composition, carbonated-hydrogen, or hydro-carbonate, a name proposed to be altered by Mr Chenevix to carburetted-hydrogen.

In the decomposition of certain vegetable products by heat, other species of carburetted-hydrogen are obtained, differing little in their properties. The vapours of camphor, alcohol and ether, passed through a red-hot tube, give somewhat similar gases.

Mr Cruickshank observed, that the gas arising from marshes, disengaged in all probability by the slow decomposition of vegetable matter, is similar to the gases obtained from the decomposition of camphor, alcohol, or ether, by heat.

It is well known, that in pits and mines, the air, in consequence of admixture with this gas, is often in such a state as to suffocate, almost instantly, those who attempt to breathe it. Some of these places are consequently haunted by peculiar diseases; and doubtless this matter differs according to the diseases which it communicates, and the substances from which it has originated. Morveau lately attempted to ascertain its nature; but he soon found all our chemical tests insufficient for the purpose. He has proved, however, that this noxious matter is of a compound nature; and that it is destroyed altogether by certain agents, particularly by those gaseous bodies which readily part with their oxygen.

All these varieties of carburetted hydrogen gas, are thus capable of being analysed by the operation of the oxymuriatic acid gas, which readily parts with a great quantity of oxygen; and therefore, if mixed with these gases in due proportion, and allowed to stand for some hours, it converts them into water and carbonic acid, with variable quantities of carbonic oxyd.

Odours.

With regard to the third kind of air, namely, that which is rendered fœtid and odorous by emanations, there are still greater difficulties, because we have no correct knowledge of the nature of these emanations.

Odour, in common language, means the more or less agreeable or disagreeable sensation which any body produces on the organ of smell; by the chemist it is justly regarded as indicating the presence of some particular substance, which has the power of thus affecting our senses.

Odours are sometimes immediate particles of bodies, from which they are separated by their volatility; sometimes they are certain elements in their composition, set at liberty by the action of affinities; sometimes, lastly, they are the results of different combinations produced by the presence of a new agent.

It is generally thought, that the atmospheric fluid is the solvent of these emanations, and the cause of that expansibility which conveys them to our olfactory nerves, in a state weaker or more concentrated, as the solvent power of this fluid is itself affected by heat or humidity. Independently of differences in specific gravity, nothing but affinity can produce an equilibrium. Hence Bergman has observed, that air, even when stagnant, displaced at last carbonic acid gas; and that, on the other hand, the carburetted hydrogen gas settles in the depths of mines, which could only happen, as Berthollet remarks, in so far as it is there affected by affinities, and in a state of combination.

There can be little doubt, but that it is the whole body of the air, which is charged with these corpuscles; for if this capacity resided exclusively in oxygen or azote, the proportions of these elements would undergo a change, in the same manner as happens when air is in contact with substances disposed for acidification or oxydation; whereas eudiometric experiments indicate no sensible alteration in air shut up in close vessels with musk, assafœtida, opium and other substances equally odorous, provided the latter be kept apart from every matter susceptible of fermentation, and consequently of oxygenation.

Some have supposed, that odours had no boundaries, or could not be defined, and that they possessed only vague characters; others have maintained, that similar odours indicated similar powers, of which the effects differed only in proportion to the degree of their concentration, or of the sensibility of the organ of smell.

The constituent principles of odours, at once fetid and pernicious, or which indicate the presence of contagious miasmata, may doubtless exist in the atmosphere, without producing any distinct impression on the olfactory nerves; but, in this case, they may remain unchanged, except in the proportion which they bear to their solvent. We cannot think differently when we see, in those menstrua which produce the strongest sensations, taste and odour become weaker, as the particles are more and more diffused.

Changes in the temperature, density, &c. of the Air.

Having now considered the changes which the composition of the air undergoes, I shall proceed to describe those which affect its temperature, density, &c.

Heat.

With regard to temperature, and to its encrease in particular, there may be two reasons for the freedom from disorders during a serene and warm season; one, that though exhalation from the land and water, as well as from their various productions, must be exceedingly plentiful, yet so great is the heat of the air, that these vapours are diffused or elevated to a great height in it, while at the sametime it retains such a heat, as also prevents their coalescing and descending in the night, even in the form of dews, and they therefore remain suspended in it, so that, at those times, our lower air may be comparatively dry, or at least may not abound with moisture.

It may be very difficult exactly to ascertain what effect the heat of a climate, exclusively considered, will have in the production of disease. This state is seldom, if ever, to be met, except in combination with other causes, and wherever vegetation is to be found, the air will scarce ever want humidity sufficient for the preservation of health.

Great heat certainly produces considerable relaxation in the solids of the body, and may thus predispose to disease.

During hot weather, we know, that a less quantity of spirituous liquors intoxicate, and that vomits, purges, mercury, and opium, have greater effects than during cold weather.

On a sudden and considerable increase of heat in the air, the danger is also increased in pleurisies, peripneumonies, and other acute diseases.

We however know, from very good authority, that the heat of tropical climates, generally reputed the cause of their unhealthiness, cannot alone produce fevers, &c. except indirectly by relaxing the body.

In certain countries, even during the warmest months, diseases are scarcely ever so prevalent as at other periods of the year.

It is asserted, for instance, by Prosper Alpinus, that the plague constantly ceases at Cairo in the month of June; and that household furniture, or other infected goods, as soon as the sun enters Cancer, lose all power of communicating the infection.

Cold. With regard to cold, it is known that damp air is always colder than dry, supposing the same wind to blow, and with an equal force.

At Quebec, pleurisies and other inflammatory disorders, are the genuine produce of the cold air of that climate; while low, bilious, and intermittent fevers are scarcely ever known there.

In may also, in a great measure, be owing to the influence of cold, that the pestilential disease of yellow fever puts off its malignant disposition by degrees as the cool season advances, and is no more seen when the air is frosty or a few degrees colder than our blood.

Drought. With regard to drought, all tropical countries have properly two seasons, the wet and the dry; the former being commonly of about four months continuance, and the season of sickness; whereas, for many months of the dry season, many parts of these countries are equally healthy and pleasant with any in the world.

Perhaps it is in sandy deserts only where we can learn what distempers are incident to mankind, breathing in too dry an atmosphere. Where, however, this takes place, in a more moderate degree, a dry season is, upon the whole, more healthful than a wet one. This must, however, be understood in a limited sense; for, upon a review of the bills of mortality kept in Dublin for forty years, it appears, that the number of persons buried was remarkably greatest in dry years.

In opposition to this again, I may mention, that it is a very common observation in the East Indies, that during the dry heats the season is healthful; but when the rains fall immediately upon the hot weather, then fevers occur. The same is observed in Africa.

The island of Sardinia is annually visited by an epidemical sickness, which rages from June till September, and is called by the natives *Intemperies*. In some summers, there is a want of rain for four or five months, and then it is that this sickness is most violent, being always more fatal in some places than in others, and particularly so to strangers.

This island was formerly so remarkable for its unwholesome air, that the Romans used to banish their criminals thither; and it is at present but thinly peopled, owing to the frequent mortality occasioned by this annual sickness.

Moisture.

With regard to moisture, it may be observed, that, in the Bay of Mexico, shoals of large and ravenous sharks crowding into the harbours, and the appearance of dark thick clouds to the southward, with thunder and lightning, slowly approaching, indicate the commencement of the sickly season, and are the awful preludes of those impetuous torrents which, in a few days, are to burst from the clouds, and inundate the whole face of the country. It would appear, that these torrents of tropical countries are injurious to the health of the natives, for they (especially the mulattoes) avoid being exposed to those rains as much as possible ; and, when wet by them, immediately plunge into salt water if near it. But, indeed, in every country, though perhaps not to such a degree as in tropical ones, there is a healthy and a sickly season, and diseases are generally most prevalent after heavy rains.

Simple moisture of itself seems harmless, at least so far as relates to the production of fevers. And humid as the climate of Ireland is, it seems to be a well authorised fact, that there is no disease peculiar to it.

Dr Rutty observes, that, from a registry of the weather for 43 years, he found the fair days in Ireland were not a third of the year, whilst in England the dry days are nearly two to one.

This moisture of the climate is attributed to the exposure of Ireland to the Atlantic ocean, in which it operates as a screen to England; and to this almost constant moisture may be attributed the vivid verdure of its fields and meadows.

This climate is so salubrious, that we find, in history, that those plagues which so much devasted England, but rarely reached Ireland. The leaves, also, seldom fall from the trees before November, but the fruit is generally of a very inferior flavour, owing probably to this moisture of climate.

It is also supposed that it is the moisture of the Irish climate which is fatal to venemous animals.

When dampness is the immediate cause of disease, it is probably owing to its diminishing, or almost entirely stopping perspiration, and thus debilitating the system, and rendering it less capable of resisting morbid contagion.

It is a curious fact, that, in the countries between the tropics, heavy and continual rains produce sickness, while in other places, especially in the northern parts of Europe, want of rains brings on diseases almost similar.

Cold dampness, particularly if the wind blow from the east, affects both animal and vegetable health, and produces many obstinate diseases, as well as occasions, relapses. Pains of rheumatism, too, and corns on the feet, become troublesome on similar occasions. And even cold and moist air, or sudden thaw affecting the body in the winter, produce not only inflammatory disorders, but cause relapses into such distempers as people had been affected with during the end of summer and harvest. It is this which renders Hungary so unhealthy to an army in the field, where the cold damp nights succeed sultry days.

History informs us also, that epidemic diseases have ever been prevalent in moist weather, but more remarkably frequent in the autumnal months, when a summer unusually warm and dry has been succeeded by an extraordinary rainy season; that our fleets and armies have ever been greatly afflicted by them; and though they still continue to be severely felt in this country, they have formerly raged here with much greater violence.

Heat and Moisture.

When moisture is added to heat, complaints become both more frequent and more virulent in their nature. About the months of August and September, when these states of the weather most commonly occur together, disease is, I believe, more frequent than any other period of the year.

The most general sickness commonly begins about the middle or end of August; and whilst the days are still hot, but the nights cool and damp from fogs and dews, the dysentery, in those countries where that disease is most common, prevails; and though its violence be over by the beginning of October, yet the remitting fever gains ground, and never entirely ceases till the frost begins.

Intermitting fevers, however, most commonly set in when the weather changes from cold to warm.

A smaller quantity of Peruvian bark, also, will remove such fevers when the weather is clear and cold; and the patient continues safe as long as this season lasts: whereas, should the air be sultry and moist, the disease will hardly be removed without a perseverance in the use of that or some similar medicine.

From these and similar circumstances, it will be perceived how much the severity or mildness of complaints, as well as the medicines used for their removal, depend on seemingly trifling changes in the state of the climate.

With respect to heat and moisture, Dr Lind also seems to be of opinion, that such a state of atmosphere is most favourable to the rise and progress of acute putrid diseases, and that cold and moisture are most favourable to slow chronic ones.

As a continuation of warmth and humidity in the atmosphere has generally been observed to precede epidemics of the putrid kind, so in a low damp country, the same kind of diseases are generally endemic. All, therefore, that states of the atmosphere do, is to predispose the body for the reception of such infection as, when applied, produces disease ; whereas in a dry-warm, or in a dry-cold state of it, no morbid affection would have been produced. Plagues also abate something of their severity in warm dry weather, and generally almost entirely cease in cold dry, and frosty weather.

In a hot and moist state of the atmosphere, animal and vegetable matters run more quickly into putrefaction. It has been already observed, that matters unfavourable to health are generated from these sources, and that they seem to be possessed of a degree of virulence in proportion to the heat and moisture of the climate.

Heat, Moisture, and Putridity:

With the addition of putridity to heat and moisture, the chances of infection are still more numerous. I may remark, that, in warmer countries, sickness seldom, if ever, begins till the heats have continued long enough to give time for putrefaction. Although the fevers and fluxes then occurring, are often accompanied by worms, these are not to be deemed the cause of either, but only a sign of the bad state of the bowels from corruption of the aliment, both taking their rise from the heat, moisture, and putrid state of the air, probably in some measure owing to the immense quantities of decaying vegetables which everywhere abounds about Autumn.

Their effects in England.

Dr Sydenham, in describing the epidemic constitutions of the years 1661,-2,-3,-4, informs us, that autumnal intermittent fevers, which had prevailed for some years; and especially tertians of a bad kind, returned with violence about the beginning of July, and, becoming every day more frequent, raged exceedingly in the month of August. In many places, whole families were attacked, and the disease was extremely mortal. And in those diseases called Plagues, in London, the historian informs us, that "In the month of September, death rode triumphant; for having borrowed, (if I may be allowed the expression,) time's fatal scythe, he mowed down the people like grass; for the burials then amounted to 6988; though the week after, the bill falling to 6544, gave glimmering hopes that the distemper was past its crisis. But the great increase the week following to 7165, reimmerged the people into an abyss of horrour and despair; for now they were struck with the dreadful apprehension, that in a few days the living would not suffice to bury the dead."

The years 1765,-6, Dr Lind observes, were distinguished by an uncommon appearance of intermitting and remitting fevers, in most parts of England. During the months of May, June, and July, there were seldom at Haslar hospital less than 30 or 40 patients, labouring under regular tertian agues, with perfect intermissions. Of these, some were seized with it on board the guard ships that lay in the harbour near the mud; but the greatest number were of those marines who did duty at Portsmouth. The marines, who were three times a-week exercised early in the morning, on South sea-beach, from the effect of the stagnant water of an adjoining morass, suffered much. Half a dozen of them at a time, were frequently taken ill in their ranks, when under arms, some being seized with such giddiness in the head, that they could scarcely stand; while others fell down speechless; and, upon recovering their senses, complained of a violent head-ach.

In an account of a fever which happened in Somersetshire in 1792, we find observed, that among other particulars, it was principally ascribed to the great rains which fell sometime previous to it. This disease, it was also observed, originated principally among the poor, and attacked those of low, debilitated constitutions. It was intermittent and irregular, and, in irritable habits, was attended with spasmodic twitches, particularly about the neck. Petechiæ broke out in the latter stage of it, and this appearance increased after death.

In Greece.

Hippocrates anciently observed of the people who lived upon the banks of the river Phasis, in a very marshy country, that they differed much from the rest of mankind, being of a large size and bulk, of a bloated habit and a pale sallow complexion, of a jaundiced cast, and with a hoarse voice; and as to their mental qualities, they had, he says, a dislike for all labour and exertion of the faculties. The country of Bœotia, in Greece also, was formerly remarkable for the stupidity of the people, which was generally ascribed, and probably with reason, to the thickness and moisture of the air; and is, on that account, by Cicero, adduced in opposition to the clear dry air, and acute and lively genius of Athens. The same is, doubtless, one of the causes of the apathy and insensibility of the North American Indians, who live in a country which, from its uncultivated state, is over-run with woods and marshes; and the air of which must consequently be replete with effluvia of this kind. If this supposition be true, it will, in some measure, account for the improvement of the genius of the people, from that of the soil and climate of the country itself.

In the East Indies.

Bencoolen, too, it is observed, is more unhealthy than either Madras, Bengal, or Bombay. Bengal is next unhealthy, particularly during and after the rainy season, which commences in June, and continues till October. The diseases of the country, which are fevers of a remitting and intermitting kind, particularly attack those newly arrived. In very sickly seasons, malignant fever is the most common, and the body is covered with bloaches of a livid hue. Fluxes then also prevail. The air of Bombay is not so pure as that of Madras, yet it is more wholesome than that of Bengal.

The Malabar coast is pretty healthy, but inferior to the Coromandel coast. Madras, moreover, is the most healthy government belonging to the English.

In Persia.

At Gambroon, in Persia, the climate is very unhealthy. Indeed, few Europeans escape being seized with putrid intermittent fevers, which rage from May till September, and are often followed with obstructions in the liver.

"Various authors who have treated slightly of the diseases of Gambroon, have, as well as the English factory, imputed its unhealthfulness during the summer months to the noxious effluvia with which the air is contaminated, from the great quantities of blubber fish left by the sea upon the shore, which very soon become highly putrid and offensive.

In the island of Karee, in the Persian gulph, in the rainy seasons, intermitting fevers and fluxes are the usual distempers.

On the coast of Guinea.

As the season of those sudden and terrible storms called hurricanes, in the East and West Indies, and tornadoes on the coast of Guinea, partly coincides with that of the rains, it is evident that these dreadful tempests in some measure contribute to produce the sickness prevailing at those times. It was even remarked one year at Senegal, that at the beginning of the rainy season, in the night succeeding one of those tornadoes, a great number of the soldiers, and two-thirds of the English women, were taken ill, this garrison having before been uncommonly healthy.

But the most tremendous of these tempests is the *Samiels*, a sudden gust of wind to which travellers are exposed in the deserts, sometimes towards the middle or the end of June, but more frequently in the months of July and August, when it is said to bring almost instantaneous death to every man or beast that happens to stand with his face towards it. These samiels may, in some measure, be shunned, by travelling only in the night during the months in which they prevail.

In America.

In America, too, we find, according to Dr Lining, the sickly months in Charlestown, South Carolina, to be July, August, and September. And the mean quantities of rain and moisture in the air, are each of them greater in those three months than in the three preceding. Hence, it seems very reasonable to conclude, that the sickness is caused by the heat and moisture of the air; for bodies, as already observed, are more disposed to putrefaction in a hot and moist air, than in a cold and dry one.

In Charlestown, their epidemic diseases actually return as regularly, at their stated seasons, as a good clock strikes twelve when the sun is in the meridian, viz. in July, August, and September, when great heat and moisture prevail.

Instead, however, of the greatest fatality happening, as sometimes is the case, about the time of the rains, there are some countries where the sickness only commences about that time, and the deaths are greatest in the subsequent October and November.

We further find, that in Maryland or Virginia, where the heats are greater, and the soil more moist than more toward the north, especially on lands not cleared, agues, fevers, and fluxes, are very distressing to strangers, though the natives in general are healthy and long-lived.

The disease termed the yellow fever, which has, for some years past, committed such devastations in America, can now, therefore, be more easily accounted for than formerly, upon the very principles already delivered.

There cannot be many better proofs of the generation of this fever from the contaminated state of the air, in consequence of putrefaction, than that which happened on board one of the United States' frigates, on a voyage to the Havannah in 1799. After a storm, the weather became extremely hot, and putrefaction of some of their provision took place to such an extent, that the air in the hold, and other parts of the vessel, was contaminated so as to extinguish lights immediately. In a few days, the first man who was seized was affected by symptoms of a highly inflammatory bilious fever,—such as violent pains in the head and bones, suffusion of the face and eyes, hardness and velocity of pulse, prostration of strength, great thirst, vomiting, and costiveness. The symptoms of others, however, who were affected by, and afterwards died of it, soon assumed the actual appearance of well marked yellow fever, precisely such as it is described by authors. They had, during this voyage, no communication with vessel, town, or port, so that this disease was generated with themselves, and its surprising change must have been the consequence of change of climate.

In the West Indies.

In the West Indies, the diseases that prove fatal to soldiers, and Europeans in general, are of two kinds, namely, fevers and fluxes. These are the concomitants of armies in all parts of the world, but in tropical climates they are well known to rage with peculiar violence. There appears to be an intimate connection between them, for they are frequently combined together, often interchange with each other, and it rarely happens that one is epidemic without the other. They seem to depend upon the same cause, perhaps differently modified. The fevers are similar to what have been called remittent; but greatly more violent in their attack, quicker in their progress, and more fatal in their termination, than what are ever seen by us in Europe. They proceed from the same cause, noxious exhalations from wet, low, and marshy grounds.

Towards the production of such noxious vapours, there appears to be necessary the concurrence of three circumstances, heat, moisture, and decayed vegetable matter.

What renders Jamaica more particularly unhealthy is, that marsh effluvia, owing to the particular state of the climate, constantly exist there; whilst in northern climates they only exist during the heat of summer, when it is observed that they are uniformly unhealthy. In Jamaica, the most healthy spots are the dry and sandy, where there is little decayed animal and vegetable matter, and where the rain is absorbed by the earth. Dry, elevated, and mountainous places, too, are generally healthy; the decayed animal and vegetable matter being washed away by the frequent rains.

In an army stationed in Jamaica, it was observed, that, in less than four months, there died in the neighbourhood of marshes, or were discharged in consequence of being unfit for service, 6250 men, not one of whom died by the hands of an enemy.

These are, in various climates, the effects of heat, moisture, and putridity.

Thus, the diseases of strangers, in different climates, bear every where a proportional similitude to each other; and the violence or malignity of the fevers and fluxes, with which they are often afflicted, depend, in a great measure, upon the degrees of heat and moisture, and the other states of the respective climate.

SECT. III.—*Of Situation.*

Influence of Situation on bodily form and mental activity.

ACCORDING to the various situations of different countries, the inhabitants undergo such an astonishing variety of forms, that it is in many instances impossible to believe them to belong to the same species. We may, for instance, take as an example even an individual country, and choose Ireland, which is but of small extent, as that example. There we find, that the handsomest peasants are the natives of Kilkenny, and the neighbourhood; and the most wretched and squalid are those near Cork and Waterford, and of Munster and Connaught. In the county of Roscommon, the male and female peasantry, and even the horses, are remarked to be handsome; the former being fair and tall, possessing great muscular flexibility, and being the best leapers in Ireland. The finest hunters, and most expert huntsmen, are to be found in the fine sporting county of Fermanagh. In the county of Meath, on the contrary, the peasants are very heavily limbed. In the county of Kerry, and along the western shore, the peasants again, in expression of countenance, and colour of hair, very much resemble the Spaniards.

Thus, while the external form, and undoubtedly also the mental activity, are greatly influenced by external circumstances, the health, from different situations, is influenced in as remarkable a degree.

Influence of Situation in producing disease limited to particular spots.

We find, that the most healthy countries in the world generally contain certain spots of ground, where strangers are subject to the attacks of sickness. And, on the other hand, we find, that there is scarcely any island, or any large extent of continent, that does not contain some places, where Europeans may enjoy an uninterrupted state of health during all the seasons of the year. Previous to considering the influence of particular situations in producing disease, it is necessary, as introductory to it, to explain, that the sources of disease are never found to act but when we approach closely to them; that is, either near to the bodies of men, from which they may immediately issue; or near substances which, as having been in contact with the bodies of men, are imbued with their effluvia, and in which these effluvia are sometimes retained in an active state for a very long time. I may mention, that even the most unhealthy spots in the world have in their neighbourhood, and often at no great distance from them, places which afford a secure retreat and protection from disease and death. In a word, the diseases most fatal to strangers in every country, seem not merely to be confined to particular seasons, but, even during these seasons, to certain places only. Indeed, were not the matter of contagion continually regenerated, it would soon become perfectly inert, as it has been found, that when very unwholesome air is even conveyed to a great distance, and much time elapses before it is tried, it approaches, by some means or other, to the state of wholesome air. But where these causes of disease exist, we shall generally find a constant generation of them from some source at no great distance.

Examples of this at the Grotto del Cani, in Italy.

Many opinions have been entertained respecting the distance to which contagious effluvia are capable of being conveyed, but the specific gravity of the different kinds must vary these phenomena. In the grotto del Cani, in Italy, for instance, the distance to which its particular air spreads is very small, as instant death follows respiration at the bottom, while, at the top, this operation can be performed freely and without injury.

I have just stated, that in different countries, and even in different parts of the same country, spots greatly conducive to health, as well as to disease, are to be found; and I do not hesitate to assert, that if greater attention had been paid to this fact in the establishment of colonies, many millions of the human race, who have fallen victims to premature death, might have lived.

In the East Indies.

We shall find in the East Indies, for instance, in Sumatra, that Fort Marlborough affords a retreat tolerably safe and convenient at the distance only of three or four miles from our most sickly settlement of Bencoolen. The unhealthy town of Calcutta, also, in Bengal, has in its neighbourhood the healthy situations of Barasat and Garatte.

The Dutch, at Batavia, have the more healthy situations of Cerebon, Samaring, or Tanjapour, in their neighbourhood.

In South America.

Instances of this irregularity, in point of healthy situation, may also be mentioned in other parts of the world. The air in the different parts of the Spanish West India dominions, varies greatly in point of purity, according to the situation of places. Thus, the city of Mexico is very healthy, while La Vera Cruz, its sea-port, is remarkable for bad air.

I have pointed out the above example as a curious fact, because in general situations near the sea are, compared with other parts of the same country, the most healthy. This may be given as one instance of the short distance to which certain kinds of contagious miasmata may be capable of reaching. Hence, it is absolutely necessary, that, under such circumstances, they should be carried from place to place, by being attached to the bodies of men, &c. who come within the sphere of their action.

Still, however, independently of these favourable situations, we find that, by winds, the contagious miasmata invade the most healthy situations: Thus, the southerly winds, while they blow from the deserts of Lybia during the summer, produce at Algiers, Tunis, and Tripoli, an unhealthy season. This happens also at Madras, where the winds, in the months of April and May, passing over a large tract of sand, are always hot and disagreeable.

In many instances, it is with the greatest difficulty that these evils can be alleviated by all the art of human ingenuity.

Different effects of Insular or Continental situation in producing disease.

As it has universally been allowed, that the temperature of the air at sea is more equal in its nature, and, upon the whole, warmer than continents are, so islands being surrounded by the sea, participate more of its temperature, and are warmer than continents.

Different effects of the general situation of countries with regard to contiguity to the Equator, Seas, Mountains &c.

We find that islands and continents, situated near the equator, vary much in regard to the salubrity of climate, from local causes, even where their temperature is much the same; for if, in any of these, the heat is attended with humidity, we always find the inhabitants subject to virulent fevers, and to other malignant diseases arising from debility.

But with respect to the temperature of countries from their situation, I may observe, that all those which lie southward of any sea are warmer than those which have the sea to the southward of them, at least in our hemisphere.

All those countries lying to the windward of high mountains, or extensive forests, are also warmer than those lying to the leeward, in the same latitude.

Different effects of Situation with regard to particular soil.

We find, that the health of countries greatly depends, though perhaps in some more than others, on the particular soil of which the country is composed, and this must greatly depend on the nature of its constituent parts, as well as on those other circumstances which regulate, in a great measure, the temperature of different countries. Thus we find, that stones and sand have less capacity for heat than the other kinds of earth, which are always somewhat moist; they heat or cool, therefore, more rapidly, and to a greater degree. Hence the violent heat of Arabia and Africa, and the intense cold of Terra del Fuego. But although moderately dry, sandy soil is, in general, pretty healthy, much of this must depend on the particular nature or size of the particles of the sand of which it is composed. Thus at Pensacola, Whydah, and the island of Bonavista, is a small, loose, sand, which is found to be injurious to health.

The pestiferous vapour also, arising during the summer months, and in the heat of the day, from such sandy deserts, in South America, in Asia, and in Africa, can only be characterised by its effects. This blast, which is called the Samiel wind, proves, in these hot sandy deserts, instantly fatal, both to man to beast; but when it passes over a soil covered with grass and vegetables, its effects are mitigated.

Different effects of situation withregard to mountains or plains.

Thus, while the particular nature of the soil, or rather those emanations from the soil, greatly affect, from the nature of its situation, the health of individuals, we may remark, that health or disease may depend on other circumstances besides these. Such are elevated and mountainous places, which are even more healthy than dry and sandy ones; and that, independent of the power which mountains have in gathering and retaining clouds about them, in consequence of which, the country in the neighbourhood of high mountains is always most subject to frequent rains.

It has long been an established fact, that a far greater proportion of rain falls in mountainous countries than in plains. Among the Andes, it is said to rain almost perpetually, while in Egypt it scarcely ever rains at all. It has been in general observed, that although rains fall during the continuance of any wind, they are most frequent when the wind blows from the south.

So remarkably different, in various respects, are flat and mountainous countries, that the inhabitants of each may be considered as living in different climates.

Even Hippocrates observes, that mountaineers are active in their bodies, with their joints well fitted to each other, their skins hairy, and their minds patient of labour and watching; their tempers passionate, obstinate, and impatient of restraint; with their manners rather inclining to fierceness than mildness. They are also acute in their understandings, and in learning the arts, and diligent in their dispositions, with a turn for war and military employments.

Aristotle also takes notice, that hilly countries breed animals fiercer and stronger than those who live in plains; and that people do not feel the effect of age so soon in hilly as in flat countries.

Examples of this in Scotland, Wales, Auvergne, and Switzerland.

In consequence of this disposition, and of the form of the country, hilly regions are with difficulty conquered by a foreign force, and more generally preserve a free government, than nations who inhabit the plains. Thus, the Scots and the Welch long resisted the arms of the Romans and the Saxons.

Fertile countries, upon the same principle, are also observed to produce people less courageous than those found in barren ones.

Buffon also observes, that there are generally more old men in high than in low countries; and that the mountains of Scotland, of Wales, of Auvergne, of Switzerland, have furnished more examples of extreme old age than the plains of Holland, Flanders, Germany, or Poland. When hills, however, are found to be very high as the Glaciers and the Alps, there are much fewer instances of longevity than in more moderately elevated grounds. In Dr Price's work on reversionary payments, we find the following calculation; that in hilly districts, half of the number born live to the age of 47; in marshy districts to the age only of 25. In the former, one in 20 live to the age of 80, in the latter, one only in 52 reach that period of life.

One reason why mountainous countries, particularly in cold northern climates, are less subject to disease than warm and flat ones, is, in some measure, that the high winds prevent the accumulation of those putrid exhalations which are easily retained in lower situations.

In Persia.

Thus an asylum for health is to be met with in almost all quarters of the globe. The weary traveller, even in some parts of the sultry deserts of Arabia, may, in the middle of summer, behold from afar the summits of the Persian and Turcomanian mountains covered with snow, and their sides lined with a refreshing verdure, which is constantly fanned with a pure and temperate air.

In the East Indies.

On the rising ground near Bombay, the inhabitants enjoy the most perfect health during the rainy season, and may, in the greatest safety, behold the adjacent country covered with water, the recess of which, leaves innumerable pools of stagnating water, full of frogs and dead fish, whose stench proves very injurious to Europeans occuping the lower grounds.

Within nine miles of Madras also, stands Mount St Thomas, justly esteemed for its air the Montpelier of all our settlements in India.

In Africa.

The town of Salvadore is the most healthy in that division of the globe. Although it lies 150 miles up the river Congo or Zaire, and within six degrees of the equator, yet, from its being situated on a hill, and the neighbouring country being cleared of natural woods and thickets, its inhabitants not only breathe a pure and temperate air; but are, in a great measure, exempted from all the plagues of that unhealthy climate.

When, however, we see, in many places of the same country, the most healthy spots entirely abandoned, and, almost in their neighbourhood, the inhabitants voluntarily taking up their habitations in places from which the very causes of disease arise, we can deem such conduct nothing short of madness.

We shall only mention the high hills of Sierra Leon, upon whose summits the air is clear and serene, while thick mists, and noisome vapours overspread the lower grounds; yet, even in this place, the English inhabit a low valley, merely for the benefit of a spring of good water, the carriage of which, to any part of the hill, might easily be performed by slaves.

In America.

These heights, however, as I formerly observed, when carried to a very great extent, lose their exhilirating effects, and are destructive of human life. We shall find, that from 10 degrees north of the equinoctial, to 55 south, there runs through the continent of America, a continued chain of very high mountains, called the Andes, or Cordilleras. The tops of these mountains, even under the equator, are covered with snow, and, by the severity of the cold, are rendered uninhabitable to man or beast.

Still, however, we find, that, independently of these exceptions, high grounds exposed to the breezes are, throughout the world, the most healthy.

In the neighbourhood of Mobile, Pensacola, and other places in the hot southern, and less healthy parts of West Florida, there are several elevated situations, exposed to the winds, and dry, which would afford a safe and certain retreat from the diseases which there prevail in the months of July, August, and September.

The country of Brazil is, by the Portuguese, esteemed a paradise, chiefly on account of the purity of its air. When the sun is there vertical, the air is refreshed and cooled by the sea breezes; and its inland parts are fanned by still cooler breezes from the Andes

In Jamaica

Like this country, we shall find, that Jamaica has one continued ridge of mountains running through it, from east to west, besides some smaller hills. On the sides of these mountains, the air is temperate and cool, while the vallies are scorched with excessive heat, or inundated by violent rains. Part of this mountainous ridge is at no great distance from Spanish Town, Kingston, and Port Royal, the principal sea-port.

We do not, however, recommend a retreat to the barren, cold, and bleak summits of the Blue Mountains, where the sudden transition from the scorching heats in the vallies or woods, to so intense a degree of cold, must be injurious to the constitution; nor to such an height as where the vapours are condensed into mists or clouds.

In no part of these high grounds do they suffer from want of rain, although along the sea-coast the country is often parched. These different states must consequently produce very different effects on the health of the individuals near them. Some of the forts are very healthy, as Fort Augusta, or Stoney-hill; indeed, these two last quarters would not be reckoned unhealthy in any part of the world. Similar situations are to be found in all parts of this country, and in most of the other West India islands. The situations are of two kinds, dry sand-banks, surrounded either wholly, or in part, by the sea, and out of the reach of noxious winds blowing from swamps and marshes; and elevated situations on the mountains. In places so circumstanced, the effects of the remittent fever of that country are scarcely felt.

How much such a situation, even though but little above the exhalations, contributes to health, may be judged from this, that, in the flat part of the country, the houses upon a level with the ground, or very little raised above it, are uniformly the most unhealthy.

In Barbadoes, Antigua, and Dominica.

In Barbadoes, also, there is a hill called Scotland, or the Highlands, where the air is purer and more wholesome than in any other place upon the whole of that pleasant and healthy island.

Antigua, near English harbour, is remarkable for its unhealthfulness; but an absolute safety and secure retreat is to be found in the high mountains, especially in that called Mark's-hill.

The island of Dominica is, in most places, and especially about Prince Rupert's Bay, woody and unhealthy. Yet there are several families in it, who, by fixing their residence on the sides of the hills, live exempted from the attacks of agues and fevers, the diseases most common there; and thus enjoy as good a state of health and constitution as if they lived in Europe.

From the healthy nature of high, or rather elevated, situations, compared to plains and vallies, and the practice on the continent of building houses, prisons, &c. upon them, we have a very clear proof of the interest which has been taken by the various continental governments for the preservation of the health of their subjects.

Different effects of Situation withregard to Rivers.

The Germans, well aware of the necessity of cleanliness in prisons, have very judiciously chosen to build them in situations most conducive to it; near rivers, for instance, as at Hanover, Zell, Hamburgh, Bremen, Cologne, Mentz, and many other places.

We uniformly find, that the neighbourhood of large rivers is, upon the whole, favourable to health, provided they do not stagnate; but of all other situations we find none where the air is so pure and wholesome as in the neighbourhood of small streams running over a rocky or a pebbly bottom.

Different effects of Situation withregard to Woods and Forests

It is of the greatest importance, in choosing a healthy situation, not to allow artificial means to defeat the very end we are in pursuit of. When, for instance, houses, small villages, and even towns, are crowded with trees, they do not only confine, but moisten the air. In towns, indeed, where the houses and pavements of the streets prevent the rising of the damps, and where there are continual fires, there is less of this kind of moisture.

It has always been remarked, that agues are not only more frequent, but also more violent, in the country, and in farm-houses, than in large villages or towns. Is it not probable that this greatly depends on what I have just pointed out as causes of moisture in these places?

Different effects of Situation withregard to Exposure.

Wherever houses may be built, whether in town or country, they are most healthy where they enjoy the sun in winter, and the shade in summer; where, likewise, the prevailing winds of the particular country are allowed to blow upon that part of the house where, in consequence of the arrangement of the windows, &c. the freest circulation of air can be kept up through it. For where houses are built, or towns, &c. are situate, so that the salutary winds have no access to carry off their noxious vapours, they must of necessity be unhealthy, and their inhabitants subject to many distempers. And even when they may be well aired, if external filth and nastiness are suffered, by natural or artificial means, to accumulate, so that the very windows cannot be opened without admitting air apparently more noxious, certainly not less offensive, than that already in the room, we have no right to expect any thing but the most dangerous diseases within them.

Different effects of Situation

With respect to low ground, I may mention, that in every country, the exhalations from canals and marshes in hot weather act on the same principle with the air of foul and crowded ships; and uniformly, in whatever way they may act, produce disease. We therefore see how moisture is carefully to be avoided, since remitting fevers have ever been most prevalent in wet seasons, and chiefly incident to those who live in low damp situations.

withregard to Low and Damp Grounds.

A person, however, may be seized by an intermitting fever, or what is vulgarly termed an ague and fever, in the most wholesome spot of ground. This disease, however, is peculiarly endemial in low, woody, and marshy places, where persons of all ages, and of both sexes, are subject to its frequent attacks, and from which even infants at the breast are not exempted. It is far from being mortal to natives, though its long continuance is apt to impair their constitutions, and to produce obstinate chronical distempers.

It has been particularly observed, that while the natives of these places were uninfected by diseases of that sort, others coming into such places from a more healthy one, suffer very considerably. Although agues and intermittent fevers are most common under the above circumstances, yet they give origin to other diseases, perhaps more immediately fatal in their nature, and the causes of which are scarcely, if ever, attempted to be accounted for by medical writers.

Examples of this in London.

We know, that in some of the lowest, moistest, and closest, parts of London, where effluvia, perhaps not greatly different from that emitted by marshes, are to be found among the poorer people, spotted fevers and dysenteries are often to be met with, and these are seldom heard of among people of better rank, living in more airy situations. Hence the autumnal remittent has, by some, been called the Westminster fever; and many, by their attendance on the houses of Parliament, or the courts of law, in the beginning of the sessions, when the houses were more damp than usual, have contracted malignant diseases.

At Fort William and Fort Augustus, in Scotland.

We find medical writers observe, that the most unhealthy spots of any country are those where low damp exhaling surfaces are to be found. Sir John Pringle, in his account of the campaign in Scotland, comparing Fort Augustus to Fort William, observes, that the former of these has always been a healthy garrrison; but that the latter, which lies toward the western coast, at the distance of 28 miles from the other, has ever been sickly, and, in particular, subject to agues and the bloody flux. On the western coast there are continual rains, and the fort stands in a narrow and moist valley, surrounded by mountains; so that there is not only a greater fall of rain, but a slower evaporation in that part than in any other of the country.

Independently, however, of Fort Augustus being in general more healthy than Fort William, it would still appear that, during the autumn, it is not so; for, in the middle of August, on the camp breaking up, those troops left at Fort Augustus between 300 and 400 sick, who were afterwards carried to Inverness. By this time the hospital fever was frequent also among the inhabitants of that town; but was less mortal than usual, from the coolness of the weather, and the open situation of the place.

In the Netherlands.

A great source of humidity in the atmosphere takes place from collections of water almost immediately below the surface of the earth. This is very common in the Netherlands, where the soil is light, and the moisture easily transpiring, in summer loads the air with vapour even where no water is visible. This is also the condition of most of Dutch Brabant, where the people are more or less subject to intermittents in proportion to the distance of the water from the surface; so that by looking into their wells, it is easy to ascertain the healthiness of several of their villages.

In the East Indies.

It is a phenomenon in nature, not easily accounted for, but, at the same time, an incontestible fact, that in stagnating pools of water at Bombay, which have no communication with any river, or with the sea, and which are produced solely by the rains, living fish are generated, of which many persons have eaten, and which, upon the drying up of these pools die, are corrupted, and produce disease.

It is strange, that in India, as in every other country, so little attention has been paid to the selecting of the most healthy spots for the residence of the inhabitants, and that in general when a favourable spot was chosen, it was seemingly more an act of chance than design.

In Africa.

In Africa, also, we find, that Europeans have unfortunately fixed some of their principal settlements either on low, inland, unperflated, and uncultivated spots, the foul banks of rivers, or near their swampy and oozy mouths, or upon salt-marshes, formed by the overflowing of the ocean, where in many places the putrid fish, scattered on the shore by the negroes, emit such noisome effluvia, as proves very injurious to the constitution.

The English castle at Whydah, also, has been rendered more unhealthy than the negro town in its neighbourhood, by a small circumstance unattended to in constructing it. It is built on a spot of ground that the sea breezes cannot reach, without passing over an inconsiderable brook of water, which produces some aquatic plants, always covered with slime.

Upon this occasion I cannot help observing, that there is scarcely a physical cause which can be assigned for the production of any disease that does not, from some other accessary circumstance, admit of some exceptions. Thus, not only the woods and morasses in Guinea are tolerably healthy in the dry season, if we except Old and New Calabar, Benin, and such like places; but a few instances might be produced, of towns surrounded by marshes and a foggy air, where the inhabitants suffer, even during the rainy season, no inconvenience from their situation; of which an example is New Orleans, in Louisiana. There seem to be but two causes which can be assigned for these phenomena, either that the inhabitants become inured to such effluvia, and consequently are enabled to resist their bad effects; or, that there is some particular quality of the effluvia, by which they are unable to communicate disease.

From various other situations, although disease be not actually induced, yet other effects nearly as bad arise. On the variety of climate caused by such circumstances, the strength and activity of the inhabitants greatly depend. This truth is well known to those who trade for slaves on the African coast. The negroes they purchase are dull or stupid, lively or ingenious, sickly or robust, long or short lived, according to the situation whence they are brought.

The state to which the air is sometimes reduced in Africa by putrefaction, is scarcely, I believe, to be credited by an European who has not visited that coast. Many parts of that country are altogether uncultivated, overflowed with water, surrounded by thick impenetrable woods, and over-run with slime. The air is vitiated, noisome, and thick, insomuch that lighted torches or candles burn dimly, and seem ready to be extinguished; even the human voice loses its natural tone. The smell of the ground and of the houses is raw and offensive; but the vapour arising from the putrid water in the ditches is much worse. All this, however, seems tolerable, compared to the infinite number of insects swarming every where, both on the ground and in the air, which, as they seem to be produced and cherished by the putrefaction of the atmosphere, so they contribute greatly to increase its impurity. The wild bees from the woods, together with millions of ants, over-run and destroy the furniture of the houses; at the same time, swarms of cock-roaches often darken the air, and extinguish even the candles by their flight; but the greatest plague are the musquitoes and sand-flies, whose incessant buzz, and painful stings, are insupportable.

In the West Indies.

In the West Indies, too, it is observed, that, during the rains, the periodical sickness which attends them is much more violent in the hot, marshy, woody, or uncultivated places, than upon the adjacent islands. It is in such places, and at such times, that troops have suffered so much in these islands. Indeed, it may be laid down as a maxim, that under these circumstances, no troops can stand encampment even for a few weeks at a time. It is certainly owing to this that so many thousands of our excellent troops have, of late years, fallen on this destructive coast; while the inhabitants, comparatively speaking, scarcely at all suffered from the same cause. The sudden transition from breathing the pure sea air on their voyage, to their encampment, perhaps during the unhealthy season, exposed them to every chance of infection, which rarely failed of being most destructive to them. And this may be an additional reason why the inhabitants suffered less than our troops.

"————— Thus custom moulds
To every clime the soft Promethean clay;
And he who first the fogs of Essex breath'd,
(So kind is native air), may in the fens
Of Essex, from inveterate ills revive
At pure Montpelier or Bermuda caught."

Different effects of Situation withregard to the Sea Coast.

However inveterately the diseases of these parts may rage, such as cholera, dysentery, intermittent, and yellow fever, &c. the removal of the patients from the inland marshes to a dry sea-coast, is attended with the happiest effects; and that the pure sea air is an antidote to such affections is evident from persons never being seized by them when exposed to its influence even in the longest voyages.

Numerous examples of the beneficial effects of pure sea air in the prevention, as well as in the cure of fevers, and other diseases, may be adduced. This, however, I deem unnecessary; but I may mention one which occurred, between 40 and 50 years ago, in Naples. This city is remarkably healthy, and very populous; its streets are numerous, and the houses five or six stories high, and very much crowded. The inhabitants were extremely remiss in cleanliness, both within and without their habitations.

The disease raged with the most unremitting violence for a considerable time, till it was happily observed, that the sick who were moved into the hospitals which stood near the sea, recovered much more quickly than in other places; and that few of them died.

Upon this being represented to the King, money was ordered out of the treasury for the fitting up of hospitals by the sea, for the public benefit; and even after they became crowded, the number that died in them was inconsiderable in proportion to those lost in other places. In these well ventilated hospitals, open to the sea air, the progress of the contagion was entirely stopped, and none of the nurses or attendants on the sick were infected with the distemper.

Were we to take a survey of every country in the world, particularly those in warm latitudes, we should find, during the rainy season, that few, if any of them, are exempt from destructive diseases. Those in particular situated near the muddy and impure banks of rivers, or the foul shores of the sea, the vapours exhaling from putrid stagnant water, either fresh or salt, from large swamps, from corrupted vegetables, and other impurities, almost uniformly produce mortal diseases.

We find also that some harbours, in the Bay of Mexico, for instance, and those generally the most secure, prove fatal to Europeans from another cause. Thus, in Port Maho, near the island of Rathuan, ships lie in a bason of water, so environed with very high mountains that the wind can have no access to them; and in this respect they suffer more than even at English Harbour, Antigua. The stagnating air thence becomes so putrid and unwholesome, that the men, after being there a few days, are suddenly seized with violent vomitings, headachs, deliriums, &c. and in two or three days more the whole body putrifies, and the dissolved mass of blood issues from every pore.

Different effects of Situation withregard to the Sea itself.

These diseases cannot arise either from the moisture or coldness of the air; for, taking it in every point of view, we find air, incumbent on seas, or on large tracts of water, in general many degrees warmer in winter, and cooler in summer, than air incumbent on land; because land is more susceptible both of heat and cold than water; and, in general, air participates of the substance with which it is in contact. It must be observed, however, that small seas surrounded by land, at least in temperate and cold climates, are generally warmer in summer, and colder in winter, than the standard ocean, because they are a good deal influenced by the temperature of the land.

Whatever effect the different states of temperature may have in other respects, we may be assured, that the prevention of the accumulation of mud and filth about these shores, would infallibly render them healthy situations.

As instances of the purity of the air near fresh or salt water, I may adduce the following:

It was observed, that when the plague raged in London in 1665, it never attacked those who inhabited the houses on London bridge, and that many persons, for security against it, lived in barges on the river Thames, where the air was purified by the rising and falling of the tide 12 feet twice-a-day.

It was also observed, that during the summer and autumn of 1765, when fevers raged at Portsmouth, and in such ships as lay in that harbour, near the mud, the men who were in the ships at Spithead enjoyed perfect health.

In the island of Sardinia, when disease raged violently, the people were safe if a short way out at sea.

When a weakly European factor also leaves the coast of Guinea, he no sooner breathes the pure sea air, untainted with the land effluvia, than he finds his health mended, his appetite and his strength improved.

Necessity for change of situation being gradual.

In suddenly changing situation, as in sudden changes of every sort to which the human body can be exposed, we ought to recollect, that the danger we run is exactly in proportion to the rapidity with which we make such changes. Therefore men who thus exchange their native climate for a distant one, may be considered as affected in a manner somewhat analagous to that of plants removed to a foreign soil; where the utmost care and attention is requisite to keep them in health, and inure them to their new situation, since thus transplanted, some change and alteration must happen in the constitution of both.

Although attention to this rule is not so common as it ought to be, yet we observe that in some places it is attended to. For instance, in the unhealthy island of St Jago there is a place called St Domingo, where, on account of its wholesome air, it is usual for the governors, upon their arrival from Europe, to spend some time before they venture to fix their residence at the capital; by this means, they gradually become seasoned to the sickly climate.

CHAP. II.

OF ARTIFICIAL CAUSES.

SECT. I.—*Of Construction of Houses.*

Importance of attention to the Construction of Houses.

AMONG all the artificial causes of disease, none, perhaps, contribute a greater share, if not to their production, at least to their continuance, than the construction of houses. Although it is to negligence, in almost every instance, that we are to attribute this, we so often see houses, both with regard to their situation and construction, placed so as to have such eminently destructive effects upon health, that we are almost led to believe it had been done by design. Having committed this fault, we next attempt to justify it. But nothing can be more unreasonable than the pretences used among us to excuse this inattention and negligence; and the following authority on this subject may be adduced. Dr Mead, in his discourse concerning pestilential contagion, says, nothing approaches so near to the first original of contagion as air pent up, loaded with damps, and corrupted with the filthiness that proceeds from animal bodies. Our common prisons afford us an instance of this, in which very few escape what they call the jail fever, which is always attended with a degree of malignity in proportion to the closeness and stench of the place. And it certainly would very well become the wisdom of the government, as well with regard to the health of the town, as in compassion to the prisoners, to take care that all houses of confinement should be kept as airy and clean as is consistent with the use to which they are designed.

Quantity of air necessary for Respiration.

Owing to the particular construction, &c. of some houses, scarcely any air is to be breathed in or near them, but such as is loaded by the most filthy and offensive effluvia. How then is it possible for health to be enjoyed in them, when we find it asserted by writers upon this subject, that a gallon of fresh air is consumed every minute by a man in health; or, in other words, that a hogshead will only last him an hour. A sick person requires a larger supply, because he more quickly contaminates it; and, as a clear proof of the very bad effect of such contaminated air, animals expire sooner in it that even in a *vacuum*. We know, however, that several of the inferior animals will live in a given quantity of air until its oxygen gas is completely consumed; but those of the superior orders do not bear this total privation.

Many degrees of contamination may take place in the air before it becomes quite unfit for supporting animal life; but when air arrives at that pitch of contamination at which it extinguishes a lighted candle, then it is completely unfit for supporting life.

State to which it is reduced in confined Situations.

This state of the air is, perhaps, of all causes, most commonly produced by respiration, and certainly in this way in a far greater degree than by the perspiration of the body.

This fluid is then, as we have stated, greatly contaminated by respiration; but it may also be injured by other causes, for we find, that air corrupted by putrefaction is, of all causes of sickness, the most fatal and least understood.

The air in hospitals, crowded barracks, close transport ships, and, in a word, in every place where it is so pent up, not only loses a part of its vital principle by frequent respiration, but is also corrupted by the perspirable matter of the body. Hence it is, that in proportion to the nastiness of such places, to the number of dysenteries, and of foul sores, but, above all, of mortifications, malignant fever is both frequent and mortal.

Comparative mortality resulting from its state in Open and Confined Situations.

We may compare this state with that of the country, where the bad effects of the construction of houses is in part obviated by a free circulation of air in them. The great difference is very visible in almost every instance, when, for want of employment, the peasantry are driven into towns, where, from confinement in close and crowded manufactories, they soon exchange their ruddy complexion for a pale and meagre visage. This loss of health, also, is too commonly and fatally attended also with loss of morals, and, from the contaminating effects of vicious example, many become initiated in the low and wicked arts of chicanery and fraud.

With respect to the comparative mortality of these different situations, it is observed, that although mortality from epidemics be more constant and regular in cities than in pure open air, yet that in this last, when they do happen, they are more virulent than in the other. It must certainly, however, be allowed, that the comparative advantages are to be found upon the whole in the country.

With respect to the effects of the purity of the air in these different parts upon children, we find a calculation in the Bishop of Worcester's sermon, preached for the benefit of the Foundling Hospital in 1756, shewing, that many more children die in proportion, which are nursed in populous towns, or brought up by the hand, than if they were nursed in the country, and nourished at the breast.

That the poor of every populous town are peculiarly liable to the attacks of contagious distempers, is a fact of which every one, who has at all attended to the subject, must be fully satisfied; but those who have witnessed the situation of the lower classes in the country only, and have not been induced to explore the recesses of poverty and disease in cities, cannot be aware how many of these dwellings, on all sides closely surrounded by buildings, and in their whole appearance indicating filth and wretchedness, are in situations favourable to the spreading of infection.

Taking a general view, we shall find, that the number of deaths must greatly depend not on one, but on various circumstances combined.

The inhabitants of city, town, and country, from birth to the extreme of existence, are computed to die in the following annual proportion to the living: In London, 1 of 21; Dublin, 1 of 22; Edinburgh, 1 of 21; Vienna, 1 of 20; Amsterdam, 1 of 22; Berlin, 1 of 26. This is nearly Dr Price's calculation; but Halley, and others, compute only from 1 of 22, to 1 of 29 to die annually in cities. In smaller cities or towns, the general average of deaths is from 1 of 24, to 1 of 26; but in several provinces, and healthy country villages, from 1 of 32, to 1 of 33, up even to 1 of 45, 50, and even 60, is the annual difference. From 1 of 48, to 1 of 50 was found to be the average in upwards of a thousand country parishes on the continent. Within the above short intervals of time, there will therefore have died in the respective cities and country places enumerated, a number equal to the whole inhabitants. But the annual decrease of the oppressed negroes, in the West India islands, is estimated at 1 to 7. In some provinces of North America, according to Dr Franklin, the inhabitants double themselves in the short space of twenty-five, twenty-two, and even fifteen years. On the other hand, in all the large cities of Europe, in Paris, Vienna, Rome, Dresden, Berlin, Amsterdam, London, Edinburgh, Dublin, and almost all towns of considerable magnitude and population, the total annual births are inferior to the burials. It is calculated, that in London, within the last 150 years, near a million more of the human species have died than what were reared in it. But, in small villages and country districts, the annual births exceed the burials; and it is from this redundance that a supply is furnished for the extraordinary consumption of armies, navies, colonization, and emigration, exclusive of sickness, and other morbid casualties; the country and village surplus, therefore, prevents depopulation.

In the above calculations, the advantages are evidently derived from free open country air, where the houses are well ventilated. And the disadvantageous situations have as evidently been owing to confined air, such as in cities, where, from the construction of houses, such changes are constantly going on.

Construction of the Houses of the Poor.

Many of the houses at present occupied by the unsuspecting inhabitants are literally a nursery for the propagation of different diseases. They are small, old, and commonly very low in the ceilings. The individual apartments are very small, and *if they have windows*, they are likewise small. This arrangement was, I believe, principally made from the vitiated taste of the times in which they were built, while at the same time they contributed to keep the miserable inhabitants warmer than if more room and larger windows had been preserved. The walls, however, of most of these habitations are damp, the floor is commonly on the under storey of clay, or, if otherwise, the boards are rotten and moulded. Thus, a large family is often packed together within their own stinking clothes, foul linen, &c. sufficiently rank to suffocate either the inhabitants or any person who may approach too near them.

The roofs of houses in many parts of this country are entirely formed of straw of different kinds, which, from the rain slowly insinuating itself into their substance, gradually reduces them to one mass of putrefaction; and although disease is not thus visibly propagated, there is no doubt that the plentiful exhalation of putrid particles from these masses (sometimes, from frequent repairs, several feet in thickness,) contaminates the surrounding atmosphere, and the unsuspecting inhabitants are thus, from time to time, plunged into diseases whose existence they seldom attempt satisfactorily to account for, and whose ravages they are totally unable to arrest.

In the interior arrangement of these habitations circumstances frequently subsist, which, it must be obvious, are wholly incompatible with cleanliness and with comfort.

In many of the houses where the poor and the labourer are lodged, the rooms have no light, and fresh air is never admitted into them. Independently of disease, or rather as a precursor to it,

> " *This* wipes the roses from the cheeks of youth,
> And furrows deep the brow."

There is an uniformity in the effects of ill constructed houses, implying nastiness, want of ventilation, &c. which may easily be traced.

The habitations of the poor, where fever prevails, are low, dirty, and ill aired, being chiefly situate in narrow lanes and courts, and, in some of these miserable dwellings, fevers have never been known to be absent.

One poor family in these places seldom occupies more than one room. Their apartments in general have seldom even one window each, the sash of which, if it does exist, is either entirely fixed, or is so constructed, as to open only at a small part. A wretched bed-stead, a chair, and a stool, are not unfrequently the whole stock of furniture. The bed-clothes are, in general, scanty, tattered, and dirty; and it is a rare thing indeed that they have any change of bed-linen. Amongst the most indigent, the bed-clothes are never scoured, or the sheets washed, and an equal inattention to cleanliness is observed in their dress; their rooms are seldom, if ever, white-washed; the floors are dirty, and the stairs and passages to them filthy, dark, and unventilated; their windows being for the most part blocked up.

In such wretched habitations a fever is frequently generated; but whether it be generated or introduced into a family, the contagion spreads over the whole house.

Such, then, are often the miserable abodes in which the mechanic and the labourer is reduced to take refuge from his toils, and to waste his strength.

What innumerable sources of disease must be accumulated where houses are thus in contact in almost every direction, and where every apartment, from the cellar to the garret, is occupied, often crowded by tenants labouring under the complicated calamities of poverty and disease?

The Inhabiting of Cellars.

Although the accommodations in the middle and upper parts of such houses are extremely uncomfortable, they are, in every respect, preferable to those in the lowest apartment or cellar, where darkness, dirt, and stagnant air, combine to augment all the evils resulting from such a situation.

The shocking custom of inhabiting cellars tends at once to promote and to propagate febrile infection. But even in them the additional influence of filth and confined air is always apparent when fevers arise.

Independently of the dampness of underground houses, there is another evil with which they are troubled, that is, their being infested with vermin of various kind, the presence of which always proves troublesome, if not dangerous.

These babitations ought, by general consent, to be abandoned, or rather a law ought to exist, prohibiting all such places from being inhabited.

Indeed, it is only by quitting such apartments that relief is to be expected ; for the powers of medicine, however early employed, however judiciously directed, will be unavailing to counteract the effect, while the cause is so constantly applied, and must operate so forcibly.

From the closeness of the room, the air becomes completely vitiated by the noxious effluvia, which are deposited on the walls, and on every article within the house.

In short, every author who has occasion to mention this subject, reprobates this custom of living or sleeping in these damp underground apartments, as being nurseries of pestilent and infectious vapours ; yet nothing very active has been done to prevent it.

M. Pellegrini, professor of anatomy at Venice, who has published a translation of the *Avis aux Peuples*, with additional remarks, has made an observation, which shows the danger of damp rooms ; it is of a woman in the prime of life, and in very good health, who was always seized with an apoplexy whenever she remained in a damp place, which also went off when she removed to dry air; and which never recurred unless she returned to the damp apartment.

It may be urged in opposition to my opinion, that small miserable hovels, not of themselves well calculated for profiting by free ventilation, often contain very healthy, and often very vigorous inhabitants. Such is said to be the case in Ireland, where the habitations of the peasantry and lower orders of the people, are very small and very miserable. But this may be accounted for. These houses although small, seven feet high in general, are seldom above five or six in connection, consequently they cannot be compared to houses in large cities, where sometimes 20 or 30 families live under one roof, and it is consequently impossible to ventilate them so well as the huts in Ireland.

Among people of higher rank in society, who sleep in airy chambers, where strict attention is paid to cleanliness, the danger of infection, even when it exists in the immediate neighbourhood, is not nearly so great as among the above-mentioned orders of society. Still, however, these diseases may be carried into their houses in various ways, and, among others, the giving out of infants to nurse, introduces it among them.

The situation of life of these nurses in general, and the very small sum of money allowed them for nursing children, compel them, from economical principles, to live in habitations such as I have described. The nurse herself suffers no bad consequences, having been accustomed to vegetate in such hovels, but the infant, which has probably been taken from a well aired habitation into these vaults, lighted only from the door, or from the fire in the apartment, is often seized with a variety of apparently unaccountable disorders, which terminate in death.

Of Crowded Ships.

In these houses, in ships, particularly small ones if crowded, or in apartments however constructed, so that free circulation of air cannot be permitted in them, we find complaints of various kinds, and of every degree of virulence. In the same fleet, we often find the crews of small crowded vessels not only in a diseased state themselves, but imparting similar diseases to those of larger and better aired ships, which, but for being placed near them, would have remained in all probability in good health. This, in some respects, resembles the propagation of contagious diseases in towns or cities, where the most cleanly and formerly healthy parts suffer from the carelessness of the lower orders, and the most dirty parts of society.

In vessels, where men are crowded together, and no doubt the same happens in houses under similar circumstances, fevers which, in their commencement, are of the mildest kind, alter their form, and often become of the very worst. Something similar to this happened under the observation of Sir John Pringle, in his voyage from Holland to Britain, with the forces in 1745-6, of which many of the men died.

Of ill constructed Prisons.

In prisons, too, the most common classes of disease principally arise from similar causes, such as want of pure air, want of exercise, and proper diet, depression of spirits, exposure to cold and uncleanliness. One or more of these, with the confinement in the dark damp dungeons* of prisons, have been the chief causes of jail fever. In entering into these places, the sallow meagre countenances to be seen every where within them, declare, without words, that they are very miserable. Many who go into them in good health, are, in a few months, changed to emaciated and dejected objects. Thus sickness is introduced, and the air injured by respiration, is seldom, if ever, wafted from their sickly bodies, which, combined with whatever else in prisons, or in houses constructed on similar principles, is offensive, renders the effluvia poisonous to the highest degree. And it is a fact, that if confinement in such an atmosphere, &c. be persevered in, and the prisoners or inhabitants survive any length of time, they are not only rendered incapable of working, but many of them have their toes rotted from their feet. Brocklesby gives us an account of the progress of one of these complaints which occured in the Savoy prison, in 1762, and which was similar in its terminations to what I have now mentioned.

"These men," says he, "had been confined in a close unwholesome apartment of the Savoy, with many newly enlisted men, who were, without offence, in great numbers, and without requisite care in the non-commissioned officers, often so preposterously there huddled together, that numbers of them were at various times seized with the jail fever; and we had not a few of them brought into Pimlico hospital in this fever, after mortification had deprived them of a foot, a part of their toes, or some other extremity of their bodies; and this was absolutely owing to the nastiness and unwholesomeness of the foul air, which they were often doomed to live in."

The prisons in London, like those in many other places, are absurdly placed in the very middle of the city, or at least in parts of it where fresh air is not the most plentiful ingredient. But what is still more unpardonable, many of them that would admit ventilation, have not so much attention paid to them in that respect as even their local situation would admit of, and consequently diseases from confinement are constantly propagated among them.

No encomium, however great, can do sufficient justice to the philanthropic disposition and indefatigable exertions, of Mr Howard, who, perhaps, as a single individual, did more for the relief of the suffering poor than any one who either went before or who has followed him. It was his opinion, and I believe his opinion may still hold good, that our prisons were, in point of construction and internal management, much inferior to similar places in almost every other part of Europe which he visited. Surely this could not originate from want of airy situations, or judgment in the construction of houses in general. It must therefore have originated from artificial, and consequently removable causes, provided the interference of those at whose command such things can be done be vigorously made. But while year passes after year, and they still remain unnoticed, it would be difficult to determine whether the imprisoning or the imprisoned are the most guilty.

The perceptible difference between ours and the continental prisons, as well as their comparative effects, cannot be much better exemplified than in the following quotation from Howard.

"I sat," says he, "an afternoon with Dr Duntze of Bremen, who told me he was in London in 1753 and 54, with an inquisitive friend, a German. They went into Newgate to observe the effects of the ventilator, and were struck with an offensive smell in one of the rooms. Next day they were both indisposed. The Doctor's complaint turned out a kind of jaundice. After a few days confinement he visited his friend, and found him excessively low; and in a short time he died with every symptom of jail-fever."

The above were, I should imagine, sufficient proofs of the bad effects of all houses constructed upon similar principles. We have likewise the authority of Sir John Pringle, who observes, that jails have often been the cause of malignant fevers; and he informs us, that in the rebellion in Scotland, above 200 men of one regiment were infected with jail fever, by some deserters brought from prisons in England.

Thus, from its capability, like most other febrile complaints, of being carried to such a distance from its source, and from the many melancholy examples of the devastations recorded both in the writings of ancient and modern authors, which it has, and is daily making, no exertion ought to be withheld that can suppress it. Mr Howard thinks, that from this cause alone many more were destroyed than were put to death by all the public executions in the kingdom.

Concluding Observations.

We boast of the independence, the liberty, and the freedom, which we are so justly proud of in Great Britain, while we permit a slavery to exist in almost every part of our island, more galling in its nature, and more destructive in its consequences, than the chains of the most despotic tyrant. We constantly allow thousands to exist in the most loathsome cells, slowly but surely destroyed by those withering diseases, which are propagated with themselves, and suffered to exist, while matters perhaps no way to be compared to them in importance, are occupying the public mind.

I shall close this part of my subject by exhibiting a table from Black's comparative view of the mortality of the human species, which, taking the metropolis of our island as an example, proves that in such cities, evidently from the particular state of the buildings, and consequently the vitiated state of the air, more deaths occur than christenings.

	Years.	Christenings.	Burials.
From	1671 to 1681	12,325	19,144
——	1681 to 1691	14,439	22,363
——	1691 to 1700	14,938	20,770
——	1700 to 1710	15,623	21,461
——	1711 to 1720	17,111	23,990
——	1721 to 1730	18,203	27,522
——	1731 to 1740	16,831	26,492
——	1741 to 1750	14,457	25,351
——	1751 to 1756	15,119	21,080
——	1759 to 1768	15,710	22,956
——	1770 to 1780	17,218	21,000

SECT. II.—*Of Occupations.*

Importance of this department of the enquiry.

THERE are innumerable occupations, the prosecution of which must be less or more productive of disease; and the general importance of this enquiry must be at once apparent.

Bad effects resulting from the occupations of the learned.

The occupations of the learned present two principal causes of disease, viz. The perpetual labours of the mind, and the constant inaction of the body. "Study (says M. Rousseau) makes men tender, weakens their constitutions, and when once the body has lost its powers, those of the soul are not easily preserved. Application wears out the machine, exhausts the spirits, destroys the strength, enervates the mind, makes us pusillanimous, unable either to bear fatigue, or to keep our passions under."

This picture must be familiar to every one, for there are few who have not either seen or felt the truth of the observations it contains. The confined air which men breathe, who live almost constantly among their books, is a cause of these evils, not sufficiently attended to. A pure, open, country air is very refreshing, facilitates respiration and the functions dependent upon it, confers strength and enlivens the whole machine. But instead of enjoying the benefit of it, literary men generally live in an atmosphere, which being seldom renewed, is dense, full of vapours and inelastic; by this means, they are heated rather than refreshed, become heavy instead of being animated, and are more relaxed than strengthened; besides, this air, instead of promoting, obstructs perspiration, and thereby increases the bad effects proceeding from the other causes by which the learned are surrounded. Not to renew the air of one's room, is absolutely to live in the impurities of the preceding day. This evil certainly must be increased, if the chamber be placed where fresh air is not to be obtained. In general, however, this is not the case, and those evils are perpetuated which, by a little attention, might be avoided.

An inexcusable error, too, often practised by the learned, is the destructive habit of studying all or a greater part of the night. From such habits themselves, remonstrances stronger than any I can urge, must have arisen to every one who practises such irregularities. Independent, indeed, of any other consideration, the oily vapours arising from the candles we use for light, alone, contribute greatly to increase the danger of studying at night, by corrupting the air, and making it equally pernicious to the eyes, the general superficies of the body and the lungs. If we burn wax, the danger indeed is not so great; but it still subsists to a certain degree.

Young men beginning the study of any of the learned professions, particularly if they be swayed by that noble enthusiasm, without which excellence cannot be attained, often, by their eagerness to excel in that occupation to which they propose to devote their attention, induce diseases, the results of which they too seldom regard, till their removal becomes a difficulty, perhaps an impossibility. The warnings, arguments, entreaties and chidings of those whose experience in life hath taught them better, are often resorted to in vain; they find out a thousand ways of deceiving both their friends and themselves; one depends upon the strength of his constitution; another pleads the force of custom as capable of fitting a person for any task; a third flatters himself, that he shall still escape, because he has never yet suffered. In short, there is no end to the apologies which enthusiasm and ingenuity may suggest. This dangerous mode of proceeding has, within the circle of my own acquaintance, destroyed the lives of many young men, who, had they lived, might have done honour to any society. The lamentable disappointment too of parents, who fondly indulged the expectation of future excellence in their children, and, which, from such causes, have never been realized, are innumerable.

Even when these practices are scarcely carried to excess, every man who has, for some days, been confined to his study, must feel his head heavy, his eyes inflamed, his lips and mouth dry; he complains of uneasiness about his breast, slight tension at the pit of his stomach, is rather diposed to melancholy, his sleep is less refreshing, and his limbs are weighty and benumbed. If he still persist, all the symptoms increase, and lay the foundation of many diseases.

A walk, for two or three hours in the country, dispels these symptoms entirely, and brings back serenity, freshness and strength.

Bad effects arising from occupations in which heat is employed.

Other occupations in life, especially those where much heat is necessary, have been particularly remarked as predisposing causes of disease. In countries where the plague exists, bakers, for instance, during its influence, have been observed to suffer in a remarkable proportion. Mercurialis observes, that smiths, and all those who worked at the fire, suffered most severely in the Plague at Venice in his time.

Bad effects arising from working in metals.

The effluvia also arising from different substances have long been ranked as causes of disease; and although mineral effluvia are not likely to prove hurtful to any great number of the human race; yet there are particular employments, and even situations, which are peculiarly obnoxious to it. Such are miners, and others who, though not actually employed in working mines, reside in their neighbourhood.

That lead is taken into the body in all its various forms, is an established fact. It is immaterial whether, in the form of vapor, as among smelters, in a metallic state, as among plumbers and glaziers, in a calx as among painters and white-lead manufacturers, or in a saline state as in wine or cider. New rum distilled in proper vessels appears also to be a vehicle, in which it readily finds admission into the system.

Fallopius observes, that such as work in quick-silver mines, seldom live above three years; that they are generally affected with palsies, vertigos and other diseases of the nerves; that those who work in lead mines, are also liable to paralytic disorders, and to gripes, colics and other complaints of the bowels.

Partial paralytic disorders are even very common among those printers who are much in the habit of handling the types; particularly compositors. These diseases often affect them only in a very slight degree, and by refraining from work for a few days or weeks, they entirely disappear. At other times, one or both hands are rendered completely powerless; and, independently of the very greatest attention that can be paid to them, remain often in that state for many months. A case of this kind lately came under my care, which, independently of every variety of treatment that I could adopt, was not completely cured for several months. From the same cause also, a shrinking of the hand and fingers has been produced, and has even remained so during the person's life.

From draining, &c.

Cutting down of woods, clearing the ground from trees and shrubs, or draining marshes, are employments very fatal in hot climates, especially during the rainy season, and particularly to Europeans.

Night employments of every sort are also highly dangerous, particularly when the air is foggy; and even in our own temperate climate, the drainers of marshes have frequently been known to die of diseases which were evidently communicated to them while employed in their trade.

Those said to arise from tanning.

Tan yards have been pointed out by authors, and their removal recommended as likely to be of benefit to the neighbouring inhabitants. Upon finding such opinions stated in books, I have conversed with persons who must be well acquainted with these matters; and they have uniformly assured me, that the working tanners are uncommonly healthy, being seldom affected by any disease; and even those in the neighbourhood of these works have never, so far as I have been able to learn, suffered in their health in consequence of them. If bad effects have at any time appeared to arise from them, it must have been from the putrid bodies of animals from which skins had been removed.

Concluding Observations.

I have thus only adduced a few of the occupations which seem to influence the health of those employed in them. To enumerate, however, all the occupations which are well known to have this effect, would be a very tedious task; and, to the majority of my readers would certainly be uninteresting. Even the few occupations which I have mentioned, are principally adduced for the purpose of directing the attention of those who are particularly attached to these important inquiries, which, (if justice were done to the subject), would constitute a work of the highest importance to society.

I am aware, that individual instances may be stated in contradiction even to those which I have adduced; but these cannot overturn a general principle, particularly such a one as the present, which is built on the broadest basis of experience and observation. Too much time, and often splendid abilities, are thus wasted in words, when they may be much more usefully employed during the very few years of human existence. Our constant experience in life, supported by all our own feelings, hourly convinces us, that the ties by which it is held, are of the most delicate and perishable nature. Like us, every object in nature is continually undergoing spontaneous changes, the particular nature of which must infallibly contribute either to the restoration of health, or to the propagation of disease. We cannot even look on these changes and doubt of the attributes of that Deity to whom they owe their origin.

"What does not fade? the tower that long had stood
The crush of thunder, and the warring winds,
Shook by the slow, but sure destroyer Time,
Now hangs in doubtful ruin o'er its base.
And flinty pyramids, and walls of brass,
Descend: the Babylonian spires are sunk;
Achaia, Rome, and Egypt moulder down.
Time shakes the stable tyranny of thrones,
And tottering empires crush by their own weight.
This huge rotundity we tread grows old;
And all the worlds that roll around the sun."

SECT. III.—*Of Modes of Living.*

Their general influence.

IT has been observed, I believe, in every country, that, independently of circumstances, the mode of living peculiar to all, or to individual inhabitants, has a great effect in predisposing the body to the attack of those diseases which may be prevalent at the time.

Independently of other circumstances, too, particular modes of living have a remarkable effect on the increase or diminution of bodily strength; and although, in many instances, they produce no marked state of disease, yet they often influence, in a very great degree, both the state of the body, and the passions of the mind.

Effects of Luxury and Excess.

However much it may be overlooked, we shall find, that as luxury advances in any country, the health of that part of the community to which it reaches, declines. I allow, that great differences may exist with respect to its effects on stronger and weaker individuals; but this does not overturn the general principle. It is from no innovation of this kind reaching the habitation of the cottager (otherwise unexposed to disease,) that we are to attribute his uninterrupted health for an amazing length of life. His sleep is equally undisturbed by the corroding cares of the affluent, and by the unmeaning bustle of the gay and the dissipated. Their excesses neither disturb his own repose, nor tend to vitiate his healthy progeny.

I may remark, that, although irregularity may have for many years no evidently bad effect on the health of the individual who indulges in it, yet I have scarcely ever, even in those of the most robust habits, seen such practices persevered in for a number of years, that about the age of 40 or 45, the most remarkable change for the worse did not take place in the health of such persons. Indeed, where one survives such changes, perhaps a thousand lose their lives by them, or are at least rendered unfit ever after for performing the duties connected with any station in life. The streets of every city too often exhibit such spectacles, who exist only as dismal monuments of their former inconsiderate and, to call it no worse, their foolish modes of living.

And even although at first during such habits,

"—— —— No sickly qualms bedim their days,
No morning admonitions shock the head.
What woes remain! Life rolls apace,
And that incurable disease old age,

In youthful bodies more severely felt,
More sternly active, shakes their blasted prime,
Except kind nature by some hasty blow
Prevent the lingering fates. For know whate'er
Beyond its natural fervour hurries on
The sanguine tide; whether the frequent bowl,
High season'd fare, or exercise to toil
Protracted, spurs to its last stage tir'd life,
And sows the temples with untimely snow."

Luxury, also, as being unfavourable to health, and thereby rendering the body less robust and strong, contributes morbidly to increase the sensibility of the system. The petulence, indeed, of those addicted to such indulgence has been observed in every age.

In every part of the world, in short, irregularity in living seems to affect the bulk of mankind nearly in a similar way. Natives, however, of any particular country are less subject to suffer from irregularity in living than those who from other countries visit them.

Europeans, in warm climates, especially such as live intemperately, are peculiarly subject to fluxes, and to inflammations, or diseases of the liver, which last is most common in India, and particularly on the Coromandel coast.

If those, too, who are newly arrived in the West Indies, drink immoderately of newly distilled rum, they are unavoidably attacked by a violent fever; if they commit any excess in eating fruits, they are attacked by flux; if they load their stomachs with indigestible food, they are seized by cholera morbus, or vomiting, which may, in a few hours, carry them off. But it is equally certain, that the most abstemious and temperate persons sometimes die prematurely in unhealthy countries, as well as the irregular and debauched. In such instances, the particular nature of the climate acts as a predisposing cause of disease.

It may be observed, that in all countries, a greater number of children are destroyed by the absurd practice of loading their stomachs with trash of every sort, and by afterwards relieving them by repeated vomits or doses of physic, than by any natural process.

Different effects of Animal and Vegetable food.

No nations live entirely on animal, or entirely on vegetable food. The Bramins, who are said to live entirely on vegetables, use milk, which is of an animal nature. The Laplanders, who are said to live entirely on animal food, use trefoil, and other plants, very copiously. When therefore we speak of people, as either carnivorous or herbivorous, we mean, that they use the one or the other of them considerably in the larger proportion.

Vegetable food in great proportion, particularly in very hot countries, is far less nourishing than animal, and produces diarrhœa, &c.; but too much animal food loads and oppresses the body, causes indolence and dullness, after full meals, and requires the constant repetition of a sort of febrile action to throw it off, which tends greatly to wear out the constitution.

Fish has been, with probability, supposed, in its effects on the body, to hold a middle rank between other animal and vegetable food.

In warm climates, particularly in the West Indies, the negroes become, in a much greater degree, lean, and are less able to work, whilst they subsist on rice, than while using almost any other sort of food. In their dispositions, too, they become more docile; whereas animals of every description, who are carnivorous, in whatever country they may be placed, are uniformly more fierce and courageous than others exposed even to the same circumstances, who feed on vegetables.

It has been supposed, that want of antiseptic food, and due motion of the body, will be found of themselves adequate to the production of disease, without the existence of putrid miasmata, or any other external cause. Dr Beddoes seems to think that the putrefaction of animal substances in the stomach of man is a great cause of putrid and contagious disease. He says, "as long as we gorge ourselves with animal food, and dwell among its putrefactive recrements, the poisonous gazeous oxyd of azote proceeding therefrom must be expected to disturb both our respiratory and digestive functions, and be followed by scenes of distress."

It has been observed, (and it is an interesting fact), that since sugar and the ascescent vegetables became a part of the diet of the people of this country, putrid diseases have been much less frequent than formerly, when our forefathers lived upon grain and flesh, without a proper mixture of acids to correct their tendency towards putrefaction.

It is worthy of remark, that artisans and labourers in the confined manufactories of large towns, suffer prodigiously in their health in seasons when there is a failure in the crops of common fruits. The labouring classes in this country, for instance, suffered much in their general health from a scarcity of common fruit during the year 1804, and the failure again in 1805 was attended with similar effects.

Effects of Spices.

Spices contain no nourishing principle; they are only useful in giving taste and flavour to other substances. On account of their generally heating powers, they ought not to be of daily use, nor ought they at any time to be used in large quantity. The indigenous spicy herbs, however, such as parsley, marjoram, thyme, sage, and the like, cannot be too much recommended for culinary uses, as they assist greatly in the digestion of the stronger articles of food.

Of Vessels.

The internal coating of many culinary vessels being liable to solution by certain acids and oils, often produce very dangerous consequences.

Of Water.

With regard to beverage, and to water in particular, we may fortunately conclude, with tolerable accuracy, that a country producing good water, enjoys likewise a salubrious air.

Warm water, however, is always relaxing, particularly when taken in copious draughts. It also remains longer in the stomach than cold water, and consequently is more oppressive: cold liquor stimulates the stomach, but warm drink diminishes its elasticity.

Of Tea.

Tea taken twice a-day and in large quantities, however grateful it may be, is prejudicial to the constitution. It relaxes the stomach, and weakens the energy of digestion. This, however, is not so common when the tea is strong, in moderate quantity, sufficiently diluted with milk or cream, and well sweetened with sugar; for it is in reality the warm water more than the tea that is injurious.

Tea, often immoderately used, is unquestionably productive of various nervous complaints, which is very aggravating when we consider that we possess many valuable aromatic plants in our own country, which might with much greater safety be substituted for it. Such are balm, peppermint, sage, the blossoms of the lime-tree, the black thorn, the leaves of the peach and almond-trees, and the first tender leaves of whortle berries.

One of the most invariable effects of the excessive use of tea, is frequent deliquum or fainting; nor is this always unconnected with convulsive affections. These occur to many ladies who themselves are able to assign no rational cause for them; and whose medical attendants too often overlook their real nature, and instead of withdrawing the excessive use of tea, and substituting for it coffee or chocolate, as a morning beverage, dreadfully aggravate all these complaints, by the absurd prescription of a multiplicity of noxious drugs.

I am still, however, of opinion, that tea, used as above-mentioned, and in moderation, is a delightful, exhilirating, and invaluable beverage. To literary men, and persons addicted to study, it is indispensible, and it is in general rejected only by the debauched, and those accustomed to the excessive use of wine and spirits. I know, however, some who are addicted to none of these, and who yet cannot use tea.

Of Beer &c

With regard to fermented liquors, all kinds of beer ought to consist of water, malt, and hops alone; but when to these are added *cocculus indicus*, *nux vomica*, *copperas*, &c. it is highly destructive of health.

A person who has a good appetite, indeed requires no beer for the digestion of his food, and by drinking it, he acquires a full plethoric habit, with all its concomitant complaints. Beer with a *head*, as it is called, shows that it is in an imperfect state of fermentation, from which spasms and colics are produced.

Of Cyder and Perry.

Cyder and perry, being generally made in leaden vessels, and suffered to run through a leaden tube, which they corrode, lead is thus introduced into the body, and occasions the most painful and dangerous colics.

Of Wine. A long continued use of wine uniformly destroys the health and digestive powers, even although it be not carried to excess. It, therefore, ought to be very sparingly used, and that only while likewise using food; at dinner, for instance.

Of Ardent Spirits. The depravation of every valuable quality, either of mind or body, occasioned by the immoderate use of spirits, ought to warn us against their too great use. The throat and stomach are rendered callous, and the glands about these parts are occasionally indurated, so as almost to occasion suffocation. In consequence of this, we see irreparable injuries sustained by the nervous system, as debility of mind, and hypochondriasis, while jaundice, dropsy, and consumption, are its almost invariable results.

If spirits be distilled over peppermint, balm, anniseed, or carraway, their strength is not much encreased; but if over cinnamon, cloves, mace, or other hot spices, they are rendered still more heating and pernicious to health.

Individuals of much sensibility and irritability, and persons after having taken violent exercise, are more liable to become intoxicated by their use, than those of a calm and a phlegmatic temperament.

Of changes in the mode of Living.

Attention to these particulars is too seldom considered in the light that its importance deserves, and by neglect of them we acquire habits which can only be laid aside with the greatest difficulty, and often not without the greatest risk. It must be evident to every one, that there is a common routine in living, both in regard to food and drink, which, even although of itself it should not be much calculated for the preservation of health, cannot, without risk, be laid aside, at least suddenly, even for one more evidently congenial to health. People who indulge in excess in either of these matters, and suddenly depart from such habits, are, at all times, in the greatest danger of being seized by disease of every kind; but more particularly by those epidemics, which, in every country, and under every circumstance, are from time to time known to prevail.

Proper regulations for diet, which obviate, or rather prevent the bad effects stated in this section, will be found under the title of *police, &c. for modes of living*, in the third section of the second part of this book.

SECT. IV.—*Of Manners.*

IN the whole range of science, there is perhaps no subject more interesting than the consideration of the manners of mankind, and their effects, when vitiated, in the production of disease. But the subject is perhaps as complex as it is interesting; and it will be necessary successively to examine the effects of the effluvia arising from the bodies of animals, becoming injurious to health from their not being removed; the effects of actual inattention to cleanliness; the effects arising from improper dress; those from improper exercise; those from excessive or impeded evacuation; those from improper exercise of the mind; and those from the mismanagement of the periods of sleep, &c.

Of the Effluvia arising from the Bodies of Animals.

Effluvia, often of the most deleterious qualities, but which have no perceptible smell, frequently issue from the bodies of men and most other animals; and various effluvia are emitted from different animals perceptible only to certain other animals, and not to all alike. It is, for instance, well known among hunters, fowlers, &c. that setting-dogs, hounds, crows, and some other animals, will be much more affected by scents, or the odorous effluvia of partridges, hares, gun-powder, &c. when the wind blows from the object toward the animal, than when it blows the contrary way, which ever way the nostrils of the animal be turned, if the air be imbued with the odorous steams; and consequently, the difference seems to proceed from this, that when the nostrils are turned to the wind, the current of the air drives the steams forcibly upon the organ, which otherwise it does not. Blood-hounds can distinctly trace the footsteps of man merely by the sense of smelling, although no particular odour is to us emitted from his body. The scent too of the flying-deer will sometimes continue upon the ground for a whole day, and sometimes more.

It has also been known, with regard to the brute creation, that they may leave, upon vegetables that have touched their bodies for any length of time, such corpuscles, as though unheeded by other animals, may, when eaten by them, produce in them such diseases as the infected animals had.

Effect of these Effluvia upon the Air.

In this and in similar ways, the air may be contaminated, or it may simply have imparted to it odorous qualities, which seemingly produce no deleterious effects upon those who breathe it. Old persons, however, people of bad habit of body, or those labouring under diseases, and such as eat and drink immoderately, will contaminate the air much faster than the healthy, the moderate, and the young. When air is vitiated, in this way, it probably approaches nearer to that state of it from which diseases arise.

Effect of these Effluvia upon Animal substances.

Many ridiculous, and some judicious enough conjectures and experiments have been made to ascertain the exact effect produced on animal substances when exposed to the influence of the different effluvia arising from various bodies. Alexander gives experiments to prove, that a piece of flesh will continue fresh a greater length of time when hung over putrid filth, than a similar piece will when hung over fresh water. A consideration, however, which appears to me to be of some importance, seems in these as well as in similar experiments to have been overlooked. What I allude to is, the probability that dead flesh may be acted upon in a very different manner, and very different results may be the consequence in it, from those of the living animal exposed to similar circumstances.

These effects modified by Habit.

Habit, however, will do a great deal in rendering the body much less assailable by disease, from the impression of noxious effluvia, than it would otherwise be where no such circumstance contributes to their prevention. This, indeed, I conceive to have an immense effect either in the prevention or the propagation of disease. Thus habit, conjoined to the manners of living, of the inhabitants of many parts of the world, fortifies them almost completely against disease, while they are actually existing in the immediate neighbourhood of most horrible masses of putrefying animal substances; and while those less accustomed to live in such an atmosphere are, for the most part, seized by the most malignant distempers on suddenly exposing themselves to its influence.

It is in a great measure owing to these circumstances, that we see individuals of one family selected as victims of disease, while others of the same family are spared. It is to these, or the manner of living in general, that those who are employed in slaughtering animals for food enjoy an uninterrupted flow of health, even while they are constantly in the habit of inhaling the most noxious vapours arising from putrefying masses of animal matters; and that marsh-drainers, who are always exposed to the influence often of the very worst kind of effluvia, enjoy their homely fare with the keenest appetite, without even being conscious that they inhale with it contaminated air.

It is on this principle, that while so many fall victims to disease, perhaps as many, if not more, equally exposed, are quite exempted from them. Were it not for this, and perhaps similar causes, the bills of mortality in every part of the world would be greatly increased. The huge masses of putrefaction produced in the cities of London and Paris, for instance, amount, in either of them, to eight or ten millions of pounds weight every year, which produce different effects according to the different circumstances particularly influencing the mind, the manners, &c. of those who are exposed to its influence. It is this, too, which preserves the Hottentots at the Cape of Good Hope, where cleanliness and decency are hardly known. They, too, make use of the most rancid and putrid provisions, and yet they are said to be as healthful a people as are any where to be found in the world. I am fully convinced, that sufficient attention has not been paid to considerations of this nature; nor have even such lessons, as men almost instinctively acquire, been sufficiently dwelt upon, and pointed out for the benefit of others.

We are likewise sufficiently aware, that certain states of the mind contribute, in no small degree, to the prevention, as well as the production, of disease. We cannot have a better instance of this than the wonderful effect such states of mind produce, as pointed out by Mr Bruce in his travels. He observes, that "the Turks and Moors are known to be predestinarians.... secure in this principle, they expose in the market-place, immediately after St John's day, the clothes of the many thousands that have died during the late continuance of the plague, all of which imbibe the moist air of the evening and morning, are handled, bought, put on, and worn, without any apprehension of danger: and though these consist of furs, cotton, silk, and woollen cloths, which stuffs are most retentive of the infection, no accident happens to those who wear them from their happy confidence *."

These effects modified by the manner of Thinking.

Contaminations, however, of the atmosphere, from all causes, and in no small degree from causes arising from the particular manners of the people, produce a state of the atmosphere highly favourable to the

Propagation of these Effects.

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* Bruce's Travels, vol. iii. p. 716, &c.

generation and propagation of disease. The various states of health and disease, too, contribute in no small degree to their production. A piece of meat, for instance, sooner putrifies that has been breathed upon by a person who has diseased lungs and a bad breath, than another of the same weight that has been breathed upon for the same length of time by a sound person.

With respect to the generation and propagation of those effluvia which constitute disease, Dr Cullen observes, "It is now well known that the effluvia constantly arising from the living body, if long retained in the same place, without being diffused in the atmosphere, acquire a singular virulence; and, in that state, being applied to the bodies of men, become the cause of a fever which is highly contagious;" and he further observes, "it is probable that the contagion arising in this manner is not, like many other contagions, permanent and constantly existing; but that it is occasionally generated."

A strong proof in favour of the opinion, that air, thus contaminated, is a source of the plague, is, that, in all countries where that disease rages with the greatest violence, the cleaner houses are less liable to be infected by it than the dirty. It is not alone by the gross filth occasioned by the inattention and carelessness of the people that diseases are propagated, for there are many other ways by which their violence may be preserved, and it can alone be prevented by the strictest attention to every species of cleanliness, even to those minute points which in themselves can scarcely be called a direct source of disease.

With regard to ventilation,—one of the best modes of obviating these bad effects, Count Rumford states, that however much heated by fires a room may be, the air of that room cannot be adulterated; as constant supplies of colder, and consequently heavier air from without are necessary to keep up that circulation within the room, which makes the fire to burn. It is only in rooms similar in coldness to the external air and where no circulation takes place, that the air must stagnate.

Mr Howard gives upwards of thirty instances of the jail distemper in English prisons, in consequence of the inattention of those whose duty it was to remedy such evils by cleanliness, proper ventilation, &c. What renders attention to these circumstances pressingly necessary, is, that the contagion, which produces infectious fever, not only originates from the accumulation of human effluvia, but is multiplied by the disease which it occasions. By the activity and minuteness of effluvia, they most readily insinuate themselves into our bodies in innumerable ways: they pass into the mouths of the absorbent vessels, always lying open on the whole surface of the body; we every moment swallow them with our saliva; with our very food they pass into our stomach; our lungs receive them with every breathe we draw; and thus they are blended with the blood. It is easy, then, to conceive, that many and great alterations must necessarily be produced by the admission of such acute and destructive agents into the inmost recesses of an animal machine. It seems to be the nature of such particles to assimilate into substances of their own kind, all fluids with which they have been mingled.

Thus we see how small a portion of putrid animal matter introduced into the blood by inoculation, affects the whole, and, in a very short time, brings it into an equal state of corruption with itself. We may appeal to the truth of history for the ravages and devastations brought on great armies closely encamped, and great cities streightly besieged, all occasioned by the stenches and putrid exhalations arising from the corruption of dead bodies lying above ground.

If any thing could be further necessary to prove the truth of what I have here asserted, I would mention a melancholy instance among ourselves. I mean the great destruction made by the jail fever at Oxford during the assizes, which has been so often recorded. In this case, from a number of persons closely confined, from filth and nastiness, the consequence of such a circumstance, from bad diet and pent up air, arose so contagious a putrefaction that it swept away the Judges, High Sheriff, Grand Jury, and great numbers of those who were attending the court, and in its ravages was little short of a plague. A latter instance again of the same kind, with similar melancholy circumstances, happened since that period at Taunton.

Mr Hume observes, that Erasmus ascribes the frequent plagues in England to the nastiness and dirt, and slovenly habits among the people. "The floors," says he, "are commonly of clay, strewed with rushes, under which lies unmolested an antient collection of beer, grease, fragments, bones, spittle, excrements of dogs and cats, and every thing that is nasty." This bears with it internal evidence of truth.

Effects of Dirtiness.

It is strange, that even in our own time we hear frequent assertions, that where the manners of the people are least of all cultivated, where they are habituated to filth of every description, there the most healthy and long-lived persons are to be found, and, in short, that diseases seldom annoy them. The fact of the matter is just this, that among these wretched and miserable abodes, few of those whose lives ought to be devoted to the alleviation of distress, wherever it is to be found, ever explore the sources of disease with sufficient attention to be able to give a true picture of its ravages. And it not being one of the least failings of the human mind to dwell on the miraculous and unaccountable, they rather choose to give a perplexing and paradoxical account of the operations of nature, than adhere to that simplicity which is evident in all her works.

Is it even to be once supposed, that, during these times, or indeed during any time, when nastiness and filth prevail, the inhabitants are more healthy than when their manners are more polished, and these nuisances unknown? Is it to be supposed, that, during these early scenes of dirtiness, when, in the military excursions of the ancient Scots, for instance, they boiled their cattle in their hides, and made shoes of the undried skins while the hair was upon them, and in every respect lived like savages, that the inhabitants were most healthy? Impossible! Besides, we have the best medical authorities, however much these partial and discordant notions may prevail, that the plague, pestilential fevers, putrid scurvies and dysenteries, have abated in Europe within this last century, which we can ascribe to no other cause than our improvement in every thing relating to cleanliness, and the more general use of antiseptics. These diseases, in short malignant diseases of every description, were in early times much more prevalent in almost every country than they have been for at least a century past, excepting indeed in places where the manners and customs of the people have become more unpolished, or where they have undergone very little change from the refinements of modern improvement.

More general causes of these effects.

The more manifest causes of these diseases are, our permitting the operation of the effects of stinking unburied carcases, overflowings of the sea, leaving dead fish putrefying in hollows among the mud, and similar causes, and the diseases arising from them have been known to acquire such virulence, that even the fish in the neighbouring sea have died in consequence of it.

It is observed also, that the plague breaks out in Constantinople only in the lodgings of the lower orders, which are generally kept in a state of excessive filthiness; the confined streets are in the same state, being generally strewed with the decaying remains of animal and vegetable substances; and such being the condition of a great part of that city, considering the temperature of the climate, it is not to be wondered that it should scarcely ever be free of plague.

Dr Lind observes, that at Bencoolen, in the East Indies, the diseases that always rage most violently during the month of October, are occasioned by dead fish and other animals left by the Ganges; and that the unhealthfulness of Gambroon arises from vast quantities of little fishes left upon the shore, which soon become highly putrid, and contaminate the air.

Several, both ancient and modern writers, in enumerating the causes of the putrid dysentery and fever, which so frequently attacks armies encamped in rainy seasons, and towards the beginning of winter, have reckoned the effluvia arising from the privies as one of the most active and virulent.

Considering the filthy habits of the Egyptians, and that the country is liable to be covered with water, stagnating under a burning sun, and filled with decaying animal and vegetable remains, it will hardly be doubted, that diseases of the worst description must be occasionally generated in that country.

Through the midst of Grand Cairo passes a great canal, which is filled with water at the overflowing of the Nile, and after the river has decreased, is gradually dried up. Into this, the people throw all manner of filth, carrion, &c. so that the stench which arises from this, and the mud together, is insufferably offensive. In this state of things, the plague every year preys upon the inhabitants, and is only stopped when the Nile, at its next overflow, washes away this load of filth; the cold winds, which set in at the same time, lending their assistance by purifying the air.

More particular causes of these effects.

In places where civilization has scarcely ever reached, these scenes are barely excusable; but in more polished states, and in the very neighbourhood of the most accomplished circles, to find these is disgraceful in the extreme, while it adds to the danger of every person within their influence.

Among the lower orders of society, the manners are, from a variety of causes, most likely to be productive of disease. They are little habituated to cleanliness, and are liable to a thousand accidents, and a thousand temptations, which every superior rank of life is free from; and they feel not, from want of education, the same happy exertion of delicacy, honour, and moral sentiment, which every where else is to be met with. In many parts even in our own island, within one small room, will be found a man and his wife, with five, six, seven, or even more children. One wretched bed-stead, with scarcely any bedding, constitutes the principal part of the furniture, and the persons of the inhabitants are all in the highest degree filthy and offensive.

When to this, is added the internal filth of their houses; for neatness is not often to be met with among their sordid dwellings in particular, the scene must be about complete. When one set of inhabitants leave such a residence, they are succeeded by another, without either inclination or intermediate time being allowed for purifying the apartment; and thus disease is perpetuated by a succession of fresh causes of, and subjects for its attack. One unaccustomed to breathe in such places, feels on coming out of them, headach and giddiness. Habit, however, in this, as in every other thing, has a wonderful effect, and it can only be from this circumstance, that, frequent as deaths are, they would be much more frequent, if only partially exposed to such causes of disease. Children and women constantly residing in such infected apartments, seem to get habituated to the action of the fomites. Men and boys, by means of fresh air and the exercise of the day, shake off the effects of the virus, and escape long unhurt. It must, however, be observed, that if, through taking cold, or any other cause, they should be confined to the house for a few days, they assuredly take the fever. It is acknowledged by every one, that the most malignant fevers and the worst of every kind of disease, are to be found in such places, and in a particular manner, if their inhabitants, which frequently happens, be clothes-brokers. The clothes sold in these places, thoroughly penetrated by contagious effluvia, are purchased by healthy persons, without suspicion; and thus fever, &c. may be carried to and propagated among the servants of the rich, and they themselves must infallibly partake of the general suffering. Thus it is fevers are by servants often introduced into a family who are unsuspicious of its approach, and generally unable to account for its origin.

Another circumstance, by no means consolatary, is, that linen and other apparel, sent to lawn-dresses in close parts of any town, must sometimes return to families thoroughly impregnated with the effluvia of putrid fever, scarlatina, small-pox, hooping-cough, or dysentery, &c.

Even in Britain, few make any doubt of the great danger attending wet rooms, and damp clothes or beds; yet they are allowed to exist every where, without considerations of that importance being attached to them which they are entitled to.

Among these people exist customs highly destructive of health. It is usual, for instance, in houses inhabited by the lower orders of society, to wash and dry their clothes in the apartments in which they sleep, and the effluvia arising from these clothes mixing with the already vitiated air of such apartments, causes catarrhs, &c. among them.

Thus every sort of nastiness, which, from the gross and unpolished manners of the people, is accumulated, has long been felt as a cause of diseases. Partial improvements, in these respects, have been made, and although from them the best effects have been experienced, no general plan for their removal has, so far as I know, ever been attempted. On the contrary, while one improvement is taking place, a fresh nuisance, equally destructive in its consequence, makes its appearance. It would however appear, that the police of foreign countries in general, is in a much better state in respect to these improvements than it is in any part of Great Britain; yet even with them, the plans are far from being perfect.

In Prisons.

A perusal of Mr Howard's book on the state of prisons, will convince any one, that the accumulated distresses which the want of cleanliness and ventilation produce; and which, notwithstanding the hints he has given, have been by no means sufficiently attended to, ought to occupy a very important part of the time of the legislature. These poor unfortunate wretches, whose situations he so ably and feelingly describes, were wholly incapable of bettering their situation. Their vices were the cause of their sufferings, and they were obliged to endure the hardness of their fate without a murmur. I know that necessity will make many bear a great deal; but when we find in common life, that voluntary confinement is quietly submitted to in filthy hovels, which, in many respects, are not more favourable to the preservation of health, than those he has described, we cannot help ascribing this sort of conduct to a kind of mania, which nothing but the interference of the Legislature can prevent. These slothful habits destroy all inclination in such people, even to partake of those advantages which they can command, and thus they become so habituated to wallow in filth, that they even lose those feelings which their wretchedness at first creates; and their children are trained up to habits equally pernicious to the physical as to the moral powers.

In those prisons, where attention is paid to the comfort, and consequently to the health of their inhabitants, the good effects of it are manifest. Mr Howard gives many instances of this, and among others, he gives as an example what occurred in one of the prisons at Paris. "They have," says he, "clean linen once a-week from a society which was established about the year 1753. The occasion of it was the prevalence of a contagious disease, which in France they call *le scorbut*, the scurvy. The distemper was found to proceed from the prisons, and to spread to the *Hotel Dieu*, whither prisoners that had it were removed. The cause of it was generally thought to be want of cleanliness in prisons; where several of those confined had worn their linens for many months, and infected the most healthy new-comers that were put into the room with them." He adds, that "this put an effectual stop to the malady in that prison." It seems to me a very clear point, that those habits which induce disease in prisons, will similarly produce them in those habitations where the same habits exist and similar manners are adopted.

I again mention it, that were the diseases thus generated confined to such situations, the evil, although great, would be, comparatively speaking, of a trifling nature to what it really is when we consider, that while these diseases exist, it is impossible to prevent them being carried to, and committing the most unwished-for devastations in the very houses of those, who, had they exerted the power invested in them, might have prevented such consequences.

It is an old observation among those who have attended to the diseases in camps, that they really did not so much seem to arise from the dampness of the situation, as In Camps.

from the men lying in their clothes, and the want of proper bedding. As a clear proof of this, it has always been found, that the officers and others, placed in similar circumstances, but who attended more particularly to these points, escaped such diseases. The effect of cleanliness and regularity of manners have a wonderful influence on the health, even when persons have few opportunities of exercise, or even of walking into the open air.

Although, among the dwellings of the poor, we can trace the rise and progress of various diseases with some accuracy; yet we have not that extensive field for observation among them, that we have in camps, jails, or large hospitals, where, when proper measures are not adopted for their prevention, diseases, similar in their nature, but more extensive in their effects, are produced. In Sir John Pringle's works, we have many instances of this kind, and, with him, it seems an established principle, that inattention to cleanliness produces many diseases; for, he says, "that, in proportion to the nastiness of such places, the number of dysenteries, of foul sores, and especially of mortifications, occur, and the malignant fever is both frequent and mortal." He gives an instance of a severe malignant fever, with sunk pulse and stupor, having occurred in the ward of an hospital where a man lay ill of an extensive mortification of his limbs. And it has been asserted by others, that it is highly probable, that a vapour, allied in its properties and effects to this gas, gives occasion to the frequency of typhus amongst people exposed to the effluvia arising from putrefying animal and vegetable matters; as in the narrow lanes of crowded cities, in farm-yards, burying-grounds, and some manufactories.

It is upon similar principles, that there is scarce an instance of a town being long invested, without some fatal malady of this kind occurring. Sometimes it may be owing to the filth of the place crowded with people, and cattle brought in for shelter, as formerly happened both at Athens and at Rome. At other times, the sickness has been occasioned by corrupted grain, and meats long salted, becoming putrid. Vegetables also, rotting in a close place, yield a cadaverous smell, and we have instances of malignant fevers occasioned by the effluvia of putrid cabbages, as well as of plants in marshes. After battles too, when vast numbers of dead bodies have been left in the field or thrown into the adjacent rivers, the waters have been so far corrupted as to occasion malignant and infectious diseases amongst the neighbouring inhabitants.

In all countries indeed, epidemic diseases, extraordinarily mortal, are generally bred in jails, sieges, camps, &c. and by authors have been called pestilential.

From Burying Grounds.

Putrid effluvia, thus destructive to human life, have been long known as the source of disease; but they have not been universally considered with an intention to their removal. As one instance of this, the impropriety of allowing burying grounds to exist in the midst of cities, becomes evident; for, even in the most temperate climates, the pernicious effects of the matters evolved from accumulated masses of putrefying bodies, are daily experienced; and, on that account, no subject has a higher claim than this to the attention of those who have the management of the internal police of cities.

Pere Cotte gives the case of a grave-digger at Montmorenci, in 1773, who, by accidentally opening the coffin of a person buried only a year before, was suddenly kiled by a vapour that issued from it. In the same year too, he mentions, that there arose a vapour from the coffin of a person recently buried, during the time of a funeral, and that of 120 persons who were present, 114 became ill of a putrid fever. Mr Robertson mentions, that a similar occurrence took place in West Linton some years ago; a school-boy getting into a new made grave, set about opening the projecting corner of a coffin, which, as soon as he had penetrated, there issued from it a strong nauseous smell, on which he exclaimed he was suffocated; he revived, on being taken out of the place, but fell immediately ill of a petechial fever, of which he died on the seventh day; and by this means a similar fever was communicated to some of the people who attended him during his illness. We must all be aware, that animal putrefaction, even in these northern climates, produces very fatal distempers, though they do not arise to the malignity of the plague.

Concluding Observations on this part of the subject.

What I have here advanced of the origin of the plague, appears to me so reasonable, that it is wonderful that authors should quit the consideration of such manifest causes for hidden qualities, such as malignant influences, &c. Other distempers, not commonly attributed to the effects of filth, have their origin evidently in this source. The origin of the disease of rickets incident to children, has been traced to have first appeared in Dorset and Somersetshire in England. The *Plica Polonica*, peculiar to certain provinces of Poland, has, as well as the former, solely arisen from nastiness and filth.

Of Dress. We cannot enough admire the beauty of nature in furnishing animals with coverings suited to the climate in which they live. Thus the arctic bear is covered with the densest fur to protect him from the perpetual cold of the polar regions; while the greater number of animals indigenous to the torrid zone are almost naked: Thus, also, the sheep of northern climes, when transported to the south, exchanges its wool for hair.

From this we might conclude, that the dress of man ought to be accommodated to the climate in which he lives, without, however scrupulously attending to all its vicissitudes. Indeed, it is impossible that we should do so; we can only *follow*, and by no means *anticipate* them, and must have experienced their worst effects before any change can be adopted. To change our mode of dressing only after we have sustained these effects cannot by any means obviate them.

The baneful custom, however, of accommodating our dress to the almanack and the fashion, rather than the vicissitudes of the weather, in this inconstant climate, must necessarily be productive of many disagreeable consequences.

As connected with the same subject, it may be observed, that some who have certain days about the change of the seasons for putting on and for putting off their fires, generally suffer severely from catarrh about these times.

Cloathing, it may be observed, is generally warm, or otherwise, both from its texture, and from the particular colour by which it is enabled to attract and conduct heat more or less slowly.

In warm countries, where fur is a common article of dress, the danger arises from its tendency to retain noxious effluvia; such as those of the plague among the Turks, putrid fevers in Hungary, and the singular disease of *Plica Polonica* in Poland, where the hair becomes greasy, and forms distinct strings.

With regard to the head-dress, it may be observed, that black heavy hats in warm climates are extremely improper, particularly among those who are obliged to undergo severe exercise. They are ill calculated for people in such situations, both from their weight, and on account of the power black substances have of absorbing heat.

Probably, also, the immense quantities of pomatum and powder plastered over the whole surface of the heads of some, gives origin to headachs, by putting a stop to perspiration. Where, however, these complaints arise from a disorder in the digestive organs, which is by no means uncommon, this custom can in these instances have very little effect.

The neck unnecessarily loaded with superfluous clothing, and bound too tight to prevent the natural motions of the head, causes much uneasiness, and is productive of apoplexies, &c. which might have been easily prevented.

It is now many years since the barbarous custom of wearing on the body tight laced stays have been justly laid aside. It would appear, however, in some instances, that they are beginning again to be worn. I sincerely hope, however, that the custom will never be so common as it has been, for by indulging in it much disease was produced. The free expansion of the lungs was prevented; the breasts became cancerous; the ribs and spine, from constant compression, became distorted; shortness of breath followed, and, in many, terminated in consumption; the digestive organs suffered derangement, and frequent nausea and vomiting followed. In short, numberless diseases were the consequence of that vicious custom, which I sincerely hope we shall never again witness.

Wedging the feet into too tight boots or shoes is a very common, yet very injurious practice. Very bad corns, and at length considerable lameness, is produced by them.

With regard to dress in general, it may be observed, that the very sparing quantity of it used by many of the fair sex, particularly by the young, is very inexcusable, being highly destructive even to the strongest constitution.

Of Exercise.

Exercise is of two kinds, the active and the passive. Under the first we rank walking, running, leaping, swimming, riding, fencing, the military exercise, athletic games, and all that requires muscular exertion. Passive exercise comprises riding in a carriage, sailing, friction, swinging, &c.

With regard to exercise, we may in general observe, that the exertion of every faculty we possess is absolutely necessary for the preservation of health, and that these faculties must be used for a great period of our lives in the open air, requires no proof on my part. No kind or degree of exercise within doors is nearly so beneficial to the health of the individual as the same sort of exercise would be in the open air. This can most satisfactorily be accounted for from the comparative impurity of the atmosphere which must be breathed within doors. Were exercise alone necessary, the employment of many individuals is calculated to give them every chance of benefiting from it; yet, unless much of the time devoted to it be employed in the open air, the organs of respiration and digestion, and consequently those of secretion, are frequently disordered. I know that exceptions may be adduced to overturn this, or any principle, but it is not on exceptions to general rules that we are to found any reasoning which we wish to be universally applicable.

Any individual faculty, however, or all of them, may be either improved in its powers, or greatly injured by the kind or degree of exercise which is employed. And as this may be used judiciously, or otherwise, health is preserved to a very old age, or this state may be prematurely brought on, and the natural term of existence considerably shortened.

Mental exertion must also have a share in causing these changes.

It is difficult to lay down any general

rule upon this subject, as what may be highly proper for one individual may be hurtful to another. When, however, bodily exercise is used to excess, it acts in many respects like general stimuli taken into the stomach. Violent exercise of body and mind persisted in for any length of time, indeed, brings on early age and premature death.

When, however, exercise is used in moderation, it increases the heat of the body, and frequency of the pulse, and invigorates the mind. A marked distinction has been drawn between exercise and motion: and distinctions of this sort have been recommended by authors during certain diseases, It has, for instance, been asserted, that while moderate exercise increases the pulse and the heat of the body, motion, for example, in a swing, lessens both. In some, exercise excites coughing, motion as frequently prevents or removes it. Violent exercise, or exercise too long continued, occasions sweating, fatigue, and languor ; motion invigorates even the most weakly, nor can it occasion sweating, or be followed by fatigue.

Swimming in cold water after having used violent exercise is very pleasant, but very pernicious.

The almost complete want of exercise, which is too common among ladies and among literary and sedentary people, brings on diffidence, fear, grief, dejection, dispiritedness, and timorousness among those who were before the most intrepid. People indulging in these habits are easily frightened, and the most trifling incident makes them tremble. Fear of death fills them with horrors. They become incapable of attention: memory at length fails them; ideas become confused; palpitations and great dejection trouble them. At night, they are fatigued and cast down, sleep becomes disturbed, and they are often incapable of thinking.

Any long continued posture of the body, also, either in lying, sitting, or standing, is injurious to health; we ought therefore to attend to these changes, which are as necessary as alternate changes of tranquillity and activity are to the mind.

Too much or too little exercise are equally productive of disadvantages, the least of these, however, particularly among children, arise from the first. Sudden transition from the one to the other is on all occasions hurtful.

Dancing, under proper limitations, is an admirable exercise, but this being often carried too far, is productive of pernicious effects. On such occasions, the effects of heating liquors, of sudden access to the cold air, the imprudent use of cooling drinks and ice itself, induce inflammatory disorders, spitting of blood, and even consumption of the lungs.

Immoderate dancing in very warm rooms, and afterwards sudden exposure to the cold night air, is also very common and very destructive.

All kinds of exercise in a circle, such as in swinging cars, which move on a wheel with perpendicular pivots, are improper, when they produce giddiness or nervous symptoms, which they are very apt to do.

Playing on wind instruments is, particularly in debilitated persons, an exercise very pernicious to health, inducing spitting of blood, cough, shortness of breath, and even pulmonary consumption. It would therefore be advisable for those fond of that delightful art to exercise their powers on other instruments less injurious to health.

Exercise immediately after meals is highly improper, as it prevents the process of digestion, producing in many sickness, eructations, heartburn, and even vomitings. Persons, however, who are, by custom, in the habit of moving after meals, in general escape these inconveniences.

If, after a fatiguing walk, while the body is in a state of perspiration, we sit down to dinner or supper, the worst consequences may ensue, particularly if we begin with cooling dishes, or take any cold drink.

Of the Evacuations.

Perspiration.

It is generally observed, that if a strong healthy man, who uses moderate exercise in good weather, eats and drinks eight pounds during 24 hours, he will discharge five of them by insensible perspiration.

From certain religious habits inducing extraordinary perspiration, it has been supposed, that those who practised them were more obnoxious to particular endemic diseases than others who were not similarly influenced. The religion of the Turks, for instance, enjoins frequent ablutions ; and it is well known, that *constant* warm bathing, by relaxing the fibres, must dispose the body to the attacks of disease. Add to this their abstinence from wine and all fermented liquors, the great antidotes to such attacks.

Although I am by no means disposed (as is too often the case with those who wish to support a particular hypothesis or theory,) to attribute to the partial suppression or vitiated state of any of the natural discharges of the body, such a vast variety of diseases as are supposed to arise from such effects, yet I certainly am of opinion, that from their derangement much uneasiness, and often disease, may arise; and, in short, while any of them continue in that state, the full possession of health cannot be enjoyed. Since health, therefore, so evidently depends on a free perspiration, which also supposes an unrestrained circulation, those who all at once, or too early in the season, change their thick for light apparel, and they likewise who are much abroad when the weather is cool, windy, or wet, more especially if they be weakly, run some risk from the temporary contraction of the surface of the skin that may thence be produced. And these effects will ever be greater, from equal causes, in weak than in strong persons, who bear every intemperature of the weather best.

Perspiration is weaker after a plentiful meal, but when the food is digested, we again perspire with increased energy; thus, going to bed immediately after supper, when this evacuation is suffering a temporary suppression, is improper; we therefore ought to sit at least two hours after supper, and to afford this benefit both to the organs of digestion and perspiration : the absurdly late hours of taking supper is highly improper.

It must be observed, that by perspiration I do not mean *sweating*. When perspirable matter collects in drops it should then be called *sweat*, and is no longer a natural and necessary evacuation. Instead of the body being invigorated by it as by perspiration, it is enfeebled, and prepared for the attack of disease.

Inattention to cleanliness contributes greatly to the suppression of insensible perspiration ; hence those who do not pay particular attention to this circumstance, must suffer from suppressed perspiration in the greatest degree.

The reciprocal connection between the functions of the stomach, and perspiration, is so obvious, that if the latter be checked, the former is immediately affected, and the reverse takes place if the stomach be disordered.

Whatever food oppresses the digestive organs has a great effect in obstructing perspiration. Depressing passions of the mind, too, have a great effect upon this evacuation.

No evacuation is so apt to occasion uneasiness as suppressed insensible perspiration. Peevishness, headach, disturbed sleep and general heaviness, are some of the symptoms which it induces; but when that function is allowed to proceed naturally, we feel vigorous, lively, and contented.

When perspiration takes place while the body is covered with linen, the same degree of absorption does not take place as when we wear flannel, or rather thick cotton: the linen remains clogged, and is thus applied to the surface of the body, much reduced in temperature even below the external atmosphere. Thus diseases of the very worst kind are produced, such as colds, gout, diarrhæa, inflammation of the lungs, or other contiguous parts; and, in those of consumptive habits, it hastens the approach of that disease. Indeed, innumerable other complaints arise from similar causes, where perspiration is stopt.

The urine, during a state of good health, particularly in the morning, is thin, clear, of a straw colour, inclining to yellow; it makes no foam but what immediately vanishes, and has no unusually disagreeable smell. On account of the increased perspiration in warm weather, it is then most scanty. In hysteric and hypochondriac persons it is, during the existence of these complaints, of increased quantity, and very Urine.

pale; it is of a whitish colour after using much weak drink, and, in debilitated persons, the foam remains on the surface of it for a considerable time. In these different states, however promising in appearance the health of individuals may be, it is by no means to be depended on.

After too little drink, the immoderate use of spirituous liquors, violent exercise, or a restless night, the urine is of a red colour; and when the stomach is disordered, and the tongue covered with white or yellow matter, the sediment is of a colour resembling brick dust.

The evacuation of urine ought always to bear some proportion to the drink we use, making due allowance for perspiration. This must be in general greatly modified by the relative state of vigour, or of debility, mode of life, and by dry or damp weather.

We must not, if we value our health, retain the urine too long, as this practice would occasion relaxation of the bladder, and other troublesome diseases; nor ought we to accustom ourselves to void it too often, as this occasions an unnecessary exertion, which must likewise be hurtful.

Retention of urine is always attended with inconvenience, and sometimes with danger. It is termed *strangury*, when only a few drops can be passed at a time; *dysuria*, when this operation is attended by pain; and *ischuria* when a complete retention of it takes place.

Alvine Excretion.

With regard to the alvine excretion, regularity is indispensibly requisite, and the opposite habits of too great facility or too great difficulty, in making this evacuation, are equally to be guarded against: in both states, aperient medicines are necessary; but that must be, in a great measure, regulated by the causes of these complaints, or the other symptoms with which they are connected. The very frequent use of aperient medicines is highly pernicious; and it must be observed, that the necessity of using them may almost always be obviated by due attention to the various points of diet and regimen.

Catamenia.

With regard to the catamenia, they also ought to be perfectly regular. They may, however, either be excessive or suppressed, and both of these occurrences are equally to be guarded against. Extreme distress frequently attends these states, but as they are generally attended by some more general and more serious derangement of the system, medical advice ought instantly to be resorted to.

Of the Operations and States of the Mind.

Passions operate upon the body either suddenly, or slowly and gradually. Men of strong imagination chiefly suffer from passions of the violent kind, while those of more understanding and less fancy, are subject to slower emotions of the mind. Indolent persons, whose sensations are dull, are less passionate than those who combine acute feelings and a lively imagination, with a clear understanding. It is from these states of mind, that the same cause in different individuals will produce almost entirely opposite effects. Diseases of the mind, too, after some time, produce various disorders of the body, as diseases of the body occasionally terminate in imbecility. Indeed, the passions of the mind are of themselves capable of producing disease, and of increasing or of diminishing its severity.

Wherever the cultivation of the mind is neglected, the passions are rude and boisterous, a love for those virtuous refinements which endear us to our fellows is never cultivated, and ungovernable rashness and brutality entirely sway us

The dominion over our passions and affections, however, is a difficult task, but it is an essential and indispensable requisite to health. For it cannot be doubted, that those who, at an early docile age, combine solid principles of virtue with a sober and active life, and who are, by frequent examples, reminded of the turpitude and disadvantages attending violent passions in others, will of themselves repress those enemies to human happiness.

Too strong emotion of the mind is attended with relaxation and heaviness, on which account persons of violent and uncontrolable passions ought cautiously to avoid gambling.

To force ourselves to exertions of any kind, and particularly those of the mind, can lead only to imperfect performances.

Joy enlivens all the corporeal powers, and, as it were, pervades the whole animal frame. Hope has nearly a similar effect; and these two affections contribute more to the preservation of health and life than all the medicines that can be administered.

Hope is the presentiment of an expected good, or the anticipation of joy. The sense of happiness involved by hope far exceeds the satisfaction received from immediate enjoyment; it consequently has a more beneficial influence on health than good fortune absolutely realised. Hope is, indeed, the only genuine source of human happiness.

Of joy, the different degrees are, gaiety, cheerfulness, mirth, exultation, rapture, and extacy.

The physical state of the body is most happy, when the mind enjoys a moderate degree of gaiety, such as is generally met with in healthy and virtuous persons.

Habitual joy and serenity, arising from perfection and due subordination of all our faculties, and their lively exercise on objects agreeable to them, constitute mental or rational happiness.

Sudden and excessive joy, however, may cause laceration of some of the vessels, spitting of blood, fevers, deprivation of understanding, swooning, and even sudden death. On this account, we ought to fortify ourselves with that share of firmness which is necessary to meet joyful as well as disastrous tidings.

Love, viewed in its most favourable light, presents to us a picture of permanent joy. The changes which this passion can effect on the whole disposition of the mind, are remarkable. Man, in that state, sets all difficulties at defiance, he surmounts every obstacle, and is enabled to perform the noblest and most heroic actions.

But an extravagant degree of love, or such as transgresses the bounds of reason, is no longer a pleasure, but a painful state of mind, attended with the most irregular emotions. It gradually consumes the vital powers, prevents nutrition, and reduces the body to a skeleton.

Disappointed love is extremely detrimental to health, and gradually destroys the body. It usually shews itself by a reserved melancholy, a general distrust, and a gloomy misanthropy, which, however, appears externally only under the character of lassitude and depression.

This mental disorder, to which females indeed are most subject, should be opposed in time by physical, but chiefly by moral remedies. Exalted ideas of virtue, of magnanimity, and a generous self-denial, are excellent antidotes to it. The physical remedies are, rigid temperance, constant employment, and much exercise; but the most successful of all is a happy marriage.

Envy principally exists in the weak and ignorant, and is principally exerted when they witness the prosperity of persons who possess superior endowments. Joy at the misfortunes, or the discovered foibles of others, self-love, calumny of their neighbours, satire and ridicule, are the neverfailing resources of their malignant disposition. Medicines are ineffectual; they must acquire knowledge, learn a philosophic calmness of mind, and endeavour to equal or surpass others in their merits rather than in their pretensions.

Fear, when continued, weakens the powers both of mind and body, and has a wonderful effect in deranging almost all the secretions. In this state, epidemic diseases are most apt to be caught, and their violence is, at all times, much aggravated by it. Violent superstitious fear has been known to produce the most dreadful effects, such as palsy, epilepsy, and even madness.

Fatal apoplexies have frequently followed sudden dread or terror, and catalepsia and epileptic fits sometimes accompany immoderate affliction, or distressing anxiety.

Anger arises from a sense or apprehension of suffered injustice, and an impetuous desire of revenge. The more usual consequences of anger, if joined to affliction, are paleness of the face, palpitation of the heart, faultering of the tongue, trembling of the limbs, and jaundice.

If hope of revenge be the predominant feature in anger, violent emotions take place in the whole system; the pulsation is increased, the muscles make uncommon efforts, the face becomes red, the eyes sparkle, and the whole body feels inclined to motion. A continuance of this passion in young and beautiful females, renders their features coarse and unpleasant; it deprives them of every charm; and induces toward them, in the opposite sex, the most rooted and decided aversion.

Inward fretting, in which sadness is combined with anger, is the more destructive, that it does not vent itself in words or external actions. And persons who thus indulge themselves in peevishness, very soon lose their appetite, together with the power of digestion; and a long list of stomachic complaints necessarily follow.

Sorrow is the reverse of joy. The lowest degree of it is concern;—when it arises from the disappointment of hopes and endeavours, it is vexation;—when silent and thoughtful, it settles into pensiveness and sadness;—when long indulged in, so as to prey upon the mind, it becomes habitual, and grows into melancholy.—Sorrow increased and continued, is called grief;—when agitated by hopes and fears, it is distraction;—when all these are overwhelmed by sorrow, it settles into despair. The highest degree of sorrow is called agony.

Sorrow seldom proves suddenly fatal, but like a slow poison, corrodes the powers of the mind and body. Under its influence, the face generally turns pale, frequent sighings follow, with a vitiated appetite and digestion.

When sorrow is not too intense, tears generally accompany it; they are the anodynes of grief, and ought not to be restrained. The flow of tears diminish the spasmodic motions in the breast and head, and restores the respiration to regularity. Thus persons, after a plentiful flow of tears, feel greatly relieved.

Those whose minds are liable to sorrow, ought to avoid as much as possible the company of persons who are fond of relating their calamities, and recounting their misfortunes. On the contrary, whatever has a tendency to cheer the mind, and to divert it from disagreeable objects, ought to be instantly resorted to.

Though it certainly is not in our power to avert grief, from which even sages and heroes are not exempt, yet we can do much to alleviate it, by denying ourselves the enjoyment which this indulgence in certain situations afford.

With frequent returns of grief, the mind at length is constantly employed in contemplating its wretched situation, so that it finds new food for it in almost every object it beholds; the deepest melancholy follows, and not unfrequently terminates in what is called a broken heart.

In despair, we see no comfort in futurity, and our ideas of approaching misery become so intolerable, that we think ourselves incapable of sustaining it, and seek a remedy in death.

Hypochondriasis, habitual dejection, hysterical affections, &c. may arise from a variety of physical causes; but they are as frequently generated in individuals otherwise healthy, by the passions or the sufferings of the mind alone.

With regard to sleep, I may remark, that to continue awake beyond a proper time consumes the vital spirits, and vertigo, violent head-ach and anxiety, are the consequences. It changes the temper and mental disposition of the most mild and gentle, occasioning the most singular and ridiculous whims. Sleep.

To read ourselves asleep is not only a pernicious, but often a highly dangerous custom.

Dreams are not in general during the first hours of sleep, but toward morning. Every thing capable of interrupting the tranquillity of mind and body may occasion them; such as crude indigested food, a hard and inconvenient posture of the body, the various kinds of hope, grief, or sorrow. Those ideas which have lately occupied our mind, or made a lively impression on us, generally constitute the subject of a dream. Men, however, who live temperately, and enjoy perfect health, are seldom troubled in that way. Hence, that sleep is most refreshing which is undisturbed by dreams, or, at least, when we have no clear recollection of them.

Feather or down-beds are in general improper, and therefore matresses of horse hair ought to be substituted for them. The use of a great load of bed-clothes arises from a vitiated habit, as they absolutely are not necessary. Both bed and clothes ought daily to be well aired, and not put upon the beds till the time of going to rest draws near. The practice of using close curtains, and covering the head with clothes, ought likewise to be avoided.

I have no hesitation in saying, that for children, the use of cradles, made according to the common custom of either tumbling or of swinging from side to side, in order to make the child sleep, is the immediate cause of many dangerous diseases. It is only by confusing or rendering the child stupid, that they can produce that effect, and, in the immature state of many of the most delicate functions for many years after birth, such shocks cannot be sustained with impunity.

Debilitated persons injure themselves by sleeping in the day time, and keeping awake the greater part of the night.

Those who indulge themselves in much sleep, are seldom liable to very strong passions; and those who sleep too little, frequently contract a violent and vindictive temper.

Too much sleep blunts the senses, stupifies the mental faculties, and renders both less fit for performing the duties of active life.

When children are permitted to sleep on soft warm beds, and encouraged to lie longer than is proper, from a mistaken notion that they cannot sleep too much, they cannot attain a solid texture of body, and a foundation is laid for many subsequent diseases.

Two or more people sleeping together in one bed, whether children or adults, although sanctioned from time immemorial, is by no means conducive to health. And the warming of beds, by charcoal fire in particular, by its imparting poisonous vapours to the clothes, is very pernicious.

CHAP. III.

OF DISEASES PRODUCED BY THESE CAUSES, &c.

Sect. I.—*Of Contagion, Infection, &c.*

Definition, &c. The various and vague application of the term contagion has been the source of much confusion. It has sometimes been used, in foreign languages as well as our own, for the plague itself; sometimes as synonymous with infection; sometimes for the virulent effluvia issuing from the sick, or from substances infected; and sometimes merely as a property common to various diseases. It is in the last of these senses that I understand it, and infection I understand to be its result.

Contagious diseases have been divided into two classes: Those of the first are termed specific contagious, and attack persons only once during life; such are the small-pox, the measles and scarlet-fever. These diseases are commonly said not to be generated by any process of nature with which we are acquainted, but always to be propagated by a previously subsisting contagion. Hence, therefore, it would follow, that if they were expelled from a kingdom, and their introduction prevented, they would not again exist in it.

Those of the second class are termed general contagious, and seize persons oftener than once; such are the fevers variously termed low, nervous, putrid, malignant, jail, hospital, &c., which, in various degrees of malignity, prevail chiefly in the habitations of the poor. These are allowed to require no subsisting contagion for their propagation, because the infection is generated wherever a number of persons is lodged together in a close, dirty, damp and ill-ventilated place; and its influence is increased by whatever produces debility of mind or of body. These contagions at least, therefore, though extinguished, will be easily again generated if the ill effects of crowding, sloth and inattention to cleanliness, be not obviated amongst the lower orders of society.

The distinction which I have now detailed bears with it some plausibility, but the sequel will, I think, rather lead us to conclude, that these diseases are generated originally wherever certain causes exist.

There is, however, another distinction which we may consider as being more justly established, namely, between diseases that proceed from certain emanations dispersed through the atmosphere, and which are termed epidemic, because they attack the multitude who receive their impression, and those that are contracted by immediate contact only with a matter also frequently invisible, but more fixed, and sometimes by the inoculation of the morbific virus. It must at once be acknowledged, that the first are the most habitually prevalent, the most difficult to guard against, and those with respect to which the necessity of preservatives and anti-contagious remedies, is chiefly felt. Now, in this class are ranked the hospital, jail and ship fevers, that which is caught in the vicinity of marshes, and, in short, all the malignant fevers which owe their existence to putrid exhalations.

Its Nature

While numerous other subjects of science have been making rapid progress toward improvement, contagion seems to have continued a subject entirely of guess—a dreadful somewhat, whose exact origin was unknown, and whose operation seemed capricious and unaccountable. To whatever side of the question however physicians have attached themselves, whether as contagionists or anti-contagionists, as they call themselves, all of them agree that diseases of various kinds are produced by obstructed ventilation, nastiness, &c. in all the various forms in which they appear. The only important difference which seems to bewilder all parties, is, Whether epidemic diseases are caused by some material emanation diffused through the atmosphere, and existing there by certain laws peculiar to itself, or by some imaginary indefinable something, which must forever elude the most minute investigation.

We may perhaps with propriety say of these violent disputants, as Mr Boyle said of the school philosophers and the vulgar, as he called them, "that, in considering the more obstruse operations and phenomena of nature, they are wont to run into extremes, which, though opposite to one another, do almost equally contribute to keep men ignorant of the true causes of those effects they admire. They have recourse to agents that are not only invisible, but inconceivable."

To whatever side we may attach ourselves on this subject, we usually find, that the advocates for both, however plausible their reasons may be, yet their objections to their adversaries are much stronger than their arguments for themselves.

To adopt any imaginary principle to explain an effect, when by certain combinations of matter, with the nature of which we are tolerably well acquainted, we can produce the phenomena we are in search of, seems to me at least unnecessary. Why thus attach ourselves to undefinable agents for explanations, when we can more satisfactorily account for the phenomena by the action of matter itself? The beauty, uniformity and simplicity of the operations of nature are unseen by us, and we force ourselves into the conviction, that these must be performed in the most complicated and unaccountable way. It is undoubtedly owing to this frowardness of disposition alone, combined with a certain degree of fancy, that we are indebted for many of those hypothetical doctrines, by which the most simple diseases of the human frame are rendered complex ; and the lives of millions sacrificed according to the supposed eminence and extensive opportunity of him who uses them.

Nothing indeed can give us so just a notion of contagion, and more clearly represent the manner by which it produces infection, than odoriferous bodies. Some of these strikingly revive the animal spirits ; others instantly depress and sink them ; we may therefore conceive, that whatever active particles emitted from any such substances do, is in the like way done by pestiferous bodies ; so that infection is no more than the effect of volatile offensive matter drawn into the body.

The proofs of the existence of a peculiar matter, as being the cause of epidemic diseases, are as follows :

1. It has been ascertained, that no change of the ordinary, physical, or chemical properties of the atmosphere takes place in countries during the prevalence of pestilential diseases.

2. The occurrence of epidemics is not always prevented by the succession of seasons, nor by remarkable changes of the weather ; the plague, influenza, and other epidemics, having been observed to prevail for years,

without suffering any abatement of their virulence.

That contagious effluvia is a matter floating in the atmosphere, is also evident from Mr Boyle's experiments, as he proves, that every body, of every degree of temperature and density, emanates a part of itself into the surrounding atmosphere. That certain substances, however, emanate in certain temperatures more than others, is likewise evident. The pestiferous matter, therefore, seems to be of that particular nature which emanates only, or at least in a greater degree, in warm climates, or in warm weather of any climate rather than in cold.

Whether these contagious particles exist in a simple or in a compound state, may be difficult exactly to ascertain; but no doubt can be entertained of their reproductive power, when we see the matter of small-pox, or the bubo of one affected with the plague, give birth to other germs of the same kind, capable of infecting thousands of individuals.

In considering the developement of contagious poisons, it must excite astonishment, that a particle so small, as frequently to be invisible, should so rapidly derange all the functions of life in a person of the most robust constitution. Should we not experience the same feeling on perceiving those inflammations without fire, those combustions without heat, those sudden instances of disorganization, and all the phenomena produced by the oxygenated muriatic acid were we not acquainted with its composition, before observing its effects? And should we not conclude, that both operate on similar principles? .

Contagions and poisons may in reality consist of the same materials, varying but in their proportions, or in some unimportant circumstance; and the virus of syphilis, small-pox, and measles, and of the spider, rattle-snake and other venomous creatures, as being all of animal production, may chiefly consist of azote and oxygen, combined perhaps with some other ingredient: there is also high probablity that marsh-miasmata will be found little else than a similar compound. The ichor of cancer and other corroding ulcers is very probably pretty much of the same thing. This idea at least seems to be countenanced by what we observe in the syphilitic virus, which, when applied to a secreting surface, causes gonorrhœa; to a dry one, chancre; to a glandular surface, bubo, &c.; and it is probable, that a similar exciting cause may, by operating upon the constitution, in one way produce continued, in another, remittent fevers, which in reality differ from each other less in their causes, than in the particular part of the body to which this cause is applied.

Mr Cruickshank tried to inoculate two subjects with a portion of the variolous virus, after mixing it with the oxygenated-muriatic acid; the insertion produced no effect, while the other portion communicated the variolous eruption.

If we reflect for a moment, we shall be convinced, that a variety of different complaints, from the mildest febrile affection to the most malignant; likewise carbuncles, buboes, and mortified extremities, all apparently arise from the same cause; at least they occur within the same apartment, in different individuals, and often more than one of these affections exist in the same individual. Hence, I think, we have some reason to believe, that these different effects rather arise from some peculiarity of constitution in different individuals, or inequality of the parts with regard to their powers of resisting morbid action, than that the sole power occasioning these differences should rest with the external agent.

It is therefore by no means improbable, that a very great proportion of the diseases of this, as well as of every other country with which we are acquainted, may originate from one or nearly the same source, and that their varieties are only modifications of each other, or exhibit a difference of appearance, solely from some peculiarity in the constitutions of the persons who may be affected.

This method of considering contagion is entirely conformable to the simplicity of nature. The assignment of a multiplicity of causes, to account for particular phenomena, always indicates want of knowledge.

Its Propagation, &c.

Disorders resembling the very worst forms of epidemics, have, however, frequently appeared, without the evident operation of one specific cause, but would at first sight seem to have been owing to the combined influence of several agents, and to be afterwards propagated by the emanation of a peculiar matter, generated in the course of the disorder. Doubtless, however, one peculiar matter was the result of all these combinations. In this way, fevers of the most malignant description are generated on ship-board, in jails, hospitals, besieged towns, and in every situation where people are much crowded. They originate, in the first place, from noxious effluvia, and are subsequently propagated by whatever causes debilitate individuals. In such circumstances, the effluvia continually rising from the bodies of men become accumulated, and consequently their constituent parts form new combinations highly pernicious to health.

From the above instances, it will be readily understood, that the primary cause of epidemical diseases is frequently confined to a limited space; but it frequently happens, that the distempers produced, generate in their course a matter which is capable of propagating itself at some distance from the original source. This matter, though only evident to the senses, in a remarkable degree, by its pernicious effects, is that of which the operation is known by the term contagion.

Febrile contagion, in whatever way generated, may be propagated either by actual contact with infected objects, or by breathing air charged with effluvia, whether proceeding from substances imbued with contagious virus, or from patients labouring under pestilential disease. It has however been observed, that substances so imbued, impart a more virulent contagion, than that arising from the effluvia of the sick.

Owing to the closeness of their pores, and to their density, stony and metallic matters are not well adapted for carrying off contagious effluvia. It is therefore evident, that the substances most likely to carry off these effluvia, are those of a loose texture, such as wool, cotton, &c.

In what relation the human body stands to effluvia of different kinds may be difficult to explain, as certain diseases affect it only, and no other animal that may come within the sphere of their action. No reason appears from comparative anatomy, why this peculiarity should exist, as anatomists and physiologists have not yet pointed out to us any peculiar properties or actions that our organs possess, which are not to be found in many other animals.

It seems, that in these febrile contagions, the poison will be more or less mischievous as it happens to be more or less concentrated; a property that is not found in what have been called specific poisons, as that of small pox, the venereal disease, and others.

At a very early period, it was imagined that the air possessed a power of dissolving contagion, and thereby rendering it inert. Dr Haygarth has since revived this opinion. It may indeed be somewhat difficult to ascertain what may be the effect of the atmosphere in actually dissolving effluvia of this nature, as much must depend on the existing state of the atmosphere, as well as on some other concomitant circumstances. We know, however, that infectious effluvia, whether issuing from the body of the patient, or from substances imbued with contagious matter, or with morbid excretions, are rendered inert, and often, I believe, harmless, by dilution with common air. The small-pox is harmless at three feet distant from the patient.

Under different circumstances, it has been found, that the air contributes in no small degree to the propagation of contagion, and that pestilential diseases never exercise such cruel ravages as when the constitution of the atmosphere is favourable to the developement of its poison.

The contagion accompanying the disease, and this disposition of the air to promote that contagion, ought to be equally considered, both being necessary to give the disease full force. When, therefore, in a corrupt state of the air, the contagious particles meet with the subtile parts generated by that corruption, by uniting with them, they become much more active and powerful, and likewise of more durable nature; so as to form an infectious matter capable of conveying the mischief to a greater distance from the diseased body.

Predisposition.

I dare say it has been observed in every country, during the prevalence of any widely spreading disease, that although the health of the inhabitants was in general bad, yet the disease was usually accounted the cause of all their complaints, and they were all recognised under its name. This is a false mode of reasoning, and has been productive of many serious mistakes. We know, for instance, that putrifying substances of different kinds, produce disease among the inhabitants immediately contiguous to it, in consequence of the surrounding atmosphere being overcharged with the putrid effluvia arising from such sources; and we likewise know, that different individuals differently situated, in a variety of ways, are differently affected by one cause, and thus from one source, various diseases may originate. This seems owing to some peculiarity of the constitution of different individuals, or an inequality of the parts with regard to their powers of resisting the influence of external agents; thus, the same influence of climate, &c., that in one person would excite diarrhœa, pneumonia, rheumatism, &c. will induce diseases of a completely different nature in others.

If, then, it has been observed, that among men equally exposed to the plague, a small number do not contract it at all; if, of two persons inoculated with the same variolous matter, the one takes the small pox, and the other does not; if, of several people bit, even until blood flows, by the same animal in the same paroxysm, none of them having applied any remedy, some of them are seized with hydrophobia, and others escape; if it is sufficient for some to touch the clothing of a person affected with the itch, in order to contract the disorder, while others may with impunity sleep in the same bed with him; if some debauchees escape from repeated dangers which they set at defiance, while the greater number suffer for a single act of indiscretion, may we not reasonably presume, that those who escape dangers under which the majority sink, possess a constitution peculiarly calculated to resist the influence of the disorders which they escape?

Predisposition alone can cause these differences; the contagious miasmata remain the same, but they no longer make the same impression on our organs, and it is that derangement in the animal economy which is caused by debilitating habits in general that produces what is called predisposition. This predisposition may exist very differently in different persons, apparently in other respects of equal health and strength; upon the same principle, that such persons equally healthy are very differently affected by the use of intoxicating liquors.

I shall have little difficulty in persuading my reader, that it is not a particular humour, pre-existent in a healthy subject, which either destroys or accelerates the action of the contagious poison, but that it is rather a state of debility, an incipient change of the body already approaching to disease, which renders some individuals more susceptible than others, of the impression of the contagious virus.

The immediate cause of agues, I may mention, is the soil and air of the place; but the predisposing causes, or those which render the constitution subject to their attacks, are many and various; such as lying in damp rooms, in linen not sufficiently dry, or travelling in cold damp nights; neglecting immediately to put on dry clothes after being wet by rain, or the like accidents. Irregularity in living is likewise a predisposing cause of disease.

Medical writers, in assigning all these as predisposing causes, seem almost, or indeed entirely, to have neglected the effect of those changes and emotions which are continually going forward in the animal machine. These perhaps do not directly cause disease of a very dangerous nature, but they must be allowed to modify their violence in a very great degree.

We are perhaps warranted in supposing, that it principally depends on our modes of living, &c We must have observed, that people from certain habits have been subject to peculiar diseases even after they had removed from the country in which these habits had been contracted. The sweating disease, for instance, which many years ago made its appearance in England, in the Low Countries, and in France, attacked those people who had for sometime left their country to avoid its ravages, while it spared strangers who resided in England. The reason must have been, that the English, on quitting their native country, carried with them their mode of living, and their habits.

Manner in which it is received.

How does the poison gain admission into the body? It may be by the lungs in respiration; by the absorbing vessels of the skin; or, by adhering to the fauces in respiration: it may even be swallowed by whatever is carried into the stomach. All these, as well as the impressions on the nerves, have had their abettors, as being the organs through which contagion is communicated to the circulating fluids.

It has been argued in favour of this being effected by means of cuticular absorption, that though water will not pass through bladders, at least for some time, yet it has been found, that venous blood acquired the colour of arterial blood from oxygen gas, as readily when these substances were separated by a bladder, as when they were in actual contact. If it can pervade them, why may it not also pervade the cuticle ? Nay, further, we know, from the experiments of Mr Cruickshanks, that the vapour perspired passes through leather, even when prepared so as to keep out moisture, at least for a certain time. It is possible, then, that water, when in a state of vapour, or when dissolved in air, may be absorbed, although water may be incapable of pervading the cuticle. The experiments, therefore, which have hitherto been made upon the absorption of the skin, are insufficient to prove that air and vapour cannot pervade the cuticle, provided there be any facts, which there certainly are, to render the contrary supposition probable.

Its Mode of Action.

The manner in which contagious effluvia acts on the body seems, at present, to be entirely built on the most vague and unsatisfactory reasoning. We may, however, hope, that experience and investigation will yet throw some light on this. We may at present remark, that an inconceivably small quantity of matter introduced into the circulation of the blood, can, as in the inoculation for the small pox, experiments with poisons, &c. act with wonderful efficacy. It would appear, therefore, that all these poisons, with many others, when introduced into the body, act only by changing the natural mode of operation of the vital powers. If they be absorbed, which is probable, they are modified and mitigated in the act of absorption, by mixing with other fluids. Still, however, even this does not explain its mode of action. Priestley and Cavendish found, that air might be rendered infectious without its deleterious qualities being discoverable by eudiometric tests.

SECT. II.—*Of Individual Diseases.*

Inflammation.

As much has been said in the preceding pages respecting the various circumstances connected with particular diseases, it will only be necessary that I should give the following rapid sketch of some of the most important diseases resulting from local causes.

Inflammation, all its modifications, and all its consequences, may, in this hasty sketch, be first considered, because they depend upon the derangement of some of those general causes which we first described, namely, those of climate, and on cold in particular.

Inflammatory disorders are most common when the sky is clear, and the barometer high with cold winds. And those most liable to be affected by them are such as are in the bloom and vigour of life, and who live in high and dry countries; those also of full rigid fibres, and it is always increased by tonic and stimulant powers applied to the body.

Inflammation is caused by burning, wounding, bruising, compressing, or over-stretching the parts, by the application of a certain degree of cold, or by substances taken into the body. When slight, it is preceded by a sense of weight and oppression, and, for some days, by a kind of anxiety before fever is superadded.

Every considerable inflammation of any part is introduced by cold shivering, and it consists in an increased flow of blood into the affected part.

All inflammations are acute and passive; the first are those which run their course rapidly, the other those which continue long, and, as it were, become habitual to the part.

In every inflammed part there is a congestion of blood, and a distention of vessels, in a greater or less degree. The soft parts when affected by it swell most; the hard least.

In the first stage of inflammation, the patient feels weak and languid, complains of coldness, his pulse is frequent and small, there is thirst, the tongue is parched, the head confused or pained, and the functions of the stomach deranged.

In general, the pulse is smaller and harder in inflammation, in proportion as the system is affected. In inflammation of the lungs, except in robust and plethoric persons, the pulse is seldom full. In cuticular inflammation, however, the pulse is fuller, but proportionally slower.

In external inflammation, there is redness, heat, pain, tension, and, when extensive, there is present some degree of fever. When it affects the internal parts, there is fever, a fixed pain in the part, with some interruption in the exercise of its function, and blood drawn exhibits, on cooling, a yellowish gluten on its surface.

Inflammation of parts, whose action is low, such as the ligaments, tendons, or bones, are extremely painful, and affect the system violently

The action of inflammation has a tendency to continue for some time after its cause is withdrawn.

The most common terminations of inflammation are resolution, suppuration, and gangrene. The first is when by blood drawn from the part, or by any other means, the cure is effected without the destruction of the affected part. The second is, when effusion of matter called pus is formed in the part, while the redness, heat, pain, and distention abate, and cold shivering is felt, with a throbbing sensation in the part. The pulse also becomes fuller and softer, and fluctuation is felt in the part which constitutes an abscess, which being opened is an ulcer. The third is preceded by extreme pain and heat in the part, with smart fever. It becomes of a dark red colour, blisters appear on it, and the pain almost entirely ceases. The part next becomes soft, flaccid, insensible; then livid; at length black; it loses its heat and consistence, and exhales a cadaverous smell.

If the pain, redness, and heat continue, the part becomes pulsatory, soft, and fluctuating, with chillness; the structure of the part is destroyed, and this termination is called suppuration. Too great a degree of inflammatory action, as well as too little, equally retards the suppurative process.

Any surface in this state of inflammation produces pus, but that state being altered, pus is not formed; it then discharges matter totally different in its properties.

The consequences of inflammation are schirrus, dropsy, adhesion, suppuration, and gangrene.

When the pain, heat, and redness disappear, and the swelling remains, it is said to end in schirrus, which happens most frequently in the glands.

When the inflammation is very violent, showing no tendency to any of these terminations, we have reason to fear mortification, particularly if the part becomes acutely painful and livid, and the part loses its heat, the pulses becomes frequent and feeble, and great diminution of strength occurs.

When gangrene has taken place, it must be separated from the living parts, by deep scarification with the knife, or, by inducing inflammatory action, in its neighbourhood it may drop off.

The effects of mortification on the general system are, feebleness of pulse, unusual weakness, thirst, squeamishness, foul tongue, and the teeth covered with sordes; the eye languid, and the features sharp and anxious. Before death, the urine and stools come away involuntarily, and the patient becomes comatose; the excretions become fœtid, sloughs are formed where pressure operates, the contractile power of the arteries ceases, and the pulse rolls or moves, but does not beat.

From a weak slow pulse, we may infer, that the general action of the system is much diminished; and when considerable intervals between the feeble contractions of the heart take place, death is not far distant.

Catarrh.

Catarrh is properly an affection of the mucous glands of the trachea and bronchiæ, and is of two kinds, the acute and the chronic.

Catarrh begins with sneezing, difficulty of breathing through the nose, which soon after discharges thin acrid matter, corroding the parts over which it passes; there is likewise a dull pain, or rather weight, about the head, slight fever, with swelling and stiffness of the eyes. Tenderness, or rather pain is felt on inspiration, with cough. There is rawness or soreness in the throat, with loss of taste and smell, and a tightness in the chest, with some difficulty of breathing.

The cough is at first dry, occasioning great pains in the chest, and the pulse toward evening is more frequent than usual.

There is difficulty of breathing, particularly in the morning: the patient attempts to relieve it by coughing, which, on expectoration becoming free, is relieved, and temporary ease is obtained. During the day the cough is teazing, though not distressing; but while in bed, the usual exertions not being made to relieve it, the mucus accumulates, and the breathing becomes obstructed, which increases, till the lungs are divested of this load by expectoration.

Next morning, the same symptoms again seize the at length enfeebled patient, and thus any little strength he may possess to support him through the fatigues of the day, is nearly exhausted.

As the disease advances, expectoration becomes excessively difficult, and the accumulation of mucus impedes respiration. In general, however, the fever ceases, the cough is less violent, the expectoration becomes more copious, and the disease disappears, leaving an eruption about the lips and nose.

There is a species of chronic catarrh very common in our island, which generally seizes enfeebled people advanced in life. From frequent repetition of catarrhal affection, and perhaps from some other causes, they become habitually affected with a sort of chronic cough, often continuing to harass them for many years, and proving extremely distressing. In some cases, it goes off in summer, and returns in winter.

When the complaint is protracted, or occurs in old people who are much exhausted by other diseases, or enfeebled by old age, the expectoration ceases, whilst the bronchial secretion goes on; the patient becomes drowsy; the skin becomes cold; the pulse small and fluttering; the face is tumified and discoloured; the lips are livid; the breathing becomes more and more difficult; till at last the bronchiæ are so replete with mucus, that the admission of a sufficient quantity of air to support life becomes impossible, and the patient dies suffocated.

Pneumonia

By the term pneumonia, we understand an inflammation of the lungs, or of the surrounding viscera. It is known by the presence of fever, difficult breathing, particularly on inspiration, and cough, with pain in some part of the thorax.

It is most common in the robust and full habit, particularly from the age of forty-five to sixty years.

This disease may be caused by cold applied to the surface of the body, and obstructing perspiration. It is most common when an inflammatory diathesis prevails in the system, and during sudden and violent changes of the weather.

The pain is often felt under the sternum, sometimes in the back between the shoulders, or near the middle of the sixth or seventh ribs. It is sometimes severe, at other times heavy and obtuse, and is much increased when the patient coughs.

Violent fever, with acute pain interrupting inspiration, is always a mark of a violent state of that disease; and during this violence, the pulse is frequent, full, strong, hard, and quick; but, in the advanced stages, it is often weak, soft, and irregular.

This disease is always most dangerous when there is violent and frequent dry cough, and great difficulty of breathing; when the patient can only lie on his back, or in somewhat of an erect posture; when the pain spreads; and when flushing of the face, irregularity of the pulse, and delirium occur.

Pneumonic inflammation most commonly proves fatal by an effusion of blood or matter into the cellular texture of the lungs, by which they are compressed, the circulation is stopt, and a fatal suffocation is induced. When it thus proves fatal, it is almost always within the first week.

Pneumonia may terminate by resolution, suppuration and gangrene.

This disease may be protracted for a week, and terminate in resolution ; but if it be protracted a fortnight, this seldom happens. When this disease thus terminates by resolution, it is commonly accompanied by some evacuation of blood from the nose, &c. Resolution is most common when there is copious expectoration of yellowish, though not purulent, matter, without much coughing, or a copious sweat over the body. The pulse then abates in frequency, and the heat of the body, with the other febrile symptoms, disappears.

Slight cold shiverings announce the suppurative process; the pulse is in general softer, the pain subsides, the cough and dyspnœa increase, and the more frequent and hectic pulse is at length formed.

Pneumonic inflammation often produces an exudation from the surface of the bronchiæ, pleura and pericardium, which are found after death.

Peripneumony is most common in spring and autumn, and when the weather changes from hot to cold.

This disease attacks persons somewhat advanced in life, of a full phlegmatic habit, and who have been addicted to the large use of fermented and spirituous liquors. Adults are the subjects of its attack, as it scarcely ever affects children.

Intemperance in drinking spirits, exertion, speaking in public, or blowing a musical instrument, will induce it.

It begins with alternate chills and heats, slight cough, some expectoration, with frequent vomiting of opaque mucus. The cough becomes frequent and violent, the headach distressing, the face flushed, with giddiness or drowsiness. There is difficult and oppressive breathing, with a sense of tightness in the chest, attended by obscure pains there, and a sense of lassitude all over the body. The urine is very turbid, and blood drawn exhibits the buffy coat on its surface.

Though the feverish and catarrhal symptoms are at first slight they suddenly become considerable, and often unexpectedly put an end to the patient's life.

Sometimes its termination is suddenly fatal, at other times the disorder continues a fortnight, and goes off. When the expectoration begins and then stops, it generally terminates fatally. Flushing of the face is one of the worst symptoms, and when the face and lips grow livid, all hopes of recovery are at an end.

In peripneumony the pulse is often so low before death that it can scarcely be felt.

Phthisis Pulmonalis, or Consumption.

By the term phthisis pulmonalis, we understand an affection of the lungs always preceded by inflammation, more or less perceptible, leading in general to an expectoration of purulent matter, and being attended by hectic fever.

Consumption seems a disease of much greater frequency in large crowded cities than in villages, or in free country air, and is most common in the vigour of life. Those also most subject to this complaint, are such as have been born of consumptive or of scrofulous parents.

The most frequent cause of phthisis is the existence of tubercles in the lungs, which at length inflame, break, and pour out their matter into the bronchiæ. Asthma, also, may occasion this disease, by producing tubercles. An accidental catarrh may even occasion the inflammation of tubercles already formed, and produce consumption.

In this country, the disease is tedious, most severe during winter and spring, sometimes almost entirely disappearing during the summer, and of those who are affected by it, the greater number die. It is often very quickly fatal in its effects, at other times very tedious, often twenty, fifty, or more years.

A shortness of breath, and a quick pulse, are two of the most dangerous signs of a suspected phthisis. Attention ought also to be paid to catarrh of long standing in phthisical persons, as both diseases, in their beginning, are very similar in appearance.

In persons predisposed to phthisis, a catarrh is also often the beginning of that disease, so that the diagnosis is often peculiarly difficult. Spitting of blood also often precedes and accompanies the disease.

In the commencement of phthisis there is felt in the chest a degree of tension, with slight dry cough. When it arises from tubercles, it usually commences with slight short cough, the breathing is hurried, the patient becomes languid and indolent, and the body becomes leaner. These symptoms advance slowly, often occupying a year or two before they become alarming.

At first the cough is attended with little expectoration, which however increases as the disease advances. This cough of phthisical persons is particularly troublesome to them on their lying down at night. It often also ceases, and, after an uncertain length of time, returns accompanied by other symptoms.

Even before the disease has far advanced, there is a paleness and sharpness of the features, with occasional circumscribed flushing of the cheeks, pains are then also felt in the thorax, and the patient experiences some difficulty in making a full inspiration. The tongue, likewise, is foul, but, as the disease advances, the inner surface of the mouth and fauces become red. The urine too, is high coloured from the commencement of the disease; and costiveness is also almost always present at the same time.

It is remarkable that, during pregnancy, and nursing, the disease seems to make least progress, but afterward hastens to a rapid termination.

As the disease advances, there are frequent cold shiverings, which are succeeded by great heat, with copious expectoration, and even vomiting of puriform matter. The pulse now intermits, the breath is offensive, and expectoration difficult, the pulse easily accelerated, breathing while asleep is laborious, and the patient wakes unrefreshed.

We may know whether the matter expectorated is pus or mucus, by dissolving it in sulphuric acid, and then adding to it some water. If it be mucus, the matter is separated, and floats in, or swims on the surface; but if pus, the separated matter falls to the bottom of the vessel. The same phenomenon happens when these matters are dissolved in fixed alkali. Mucus also is tough and naturally transparent, pus is always opake and, as it were more friable, mucus when thrown into water, remains united in circular masses, pus, by slight agitation, is broken into fragments. Mucus is much more inodorous than pus. It also swims in water, while pus sinks in it; in this, however, much depends on the air they contain.

The symptoms of hectic fever, the general attendant of consumption, are, alternate chills and flushes, frequent small pulse, loss of appetite, thirst, diarrhœa, pale urine, colliquative sweats during the night, emaciation of the body, great weakness, and before death, a red circumscribed flush upon the cheeks.

Hectic fever has also an exacerbation about noon, and in the evening, attended with some degree of cold shivering, although the skin is preternaturally warm. Sweating at length accompanies the evening exacerbation, and continues more or less profusely during the whole course of the disease.

In hectic, the appetite for food is less impaired than in any other fever. The thirst is seldom great, the mouth is moist, the tongue clean, and at length it is more or less covered with aphthæ, the eye is of a dull pearly white, the face, except during the exacerbations, is pale and ghastly, and great debility prevails. In the early stages, costiveness also prevails; but at length, occurs a diarrhœa, which alternates with sweatings. Emaciation proceeds, the hair falls out, and the nails are incurvated.

As the cough, expectoration, and hectic fever increase, pains are felt in the thorax, under the sternum, and sometimes in the side. On lying on one or other side, the pain and coughing are increased. A disagreeable burning heat is also often felt in the palms of the hands and soles of the feet. Hæmoptysis sometimes accompanies, but is as frequently absent during this disease.

When the disease has advanced far, the

patient sinks fastest during the warm months.

Diarrhœa often occurs in the last stage, sweatings, when it is stopt, break out, and when it continues, the sweats disappear. Petechiæ also late in the disease break out over the body, which becomes ulcerated from lying on it. The extremities tumify, the mind is incoherent, the body shrinks in all its dimensions, the eyes are sunk and dull, the lips cling close to the teeth, and the gums are shrivelled.

Before death, all pain and uneasiness entirely cease, the patient entertains hopes of recovery; but the supervention of hiccough and inability to perform any voluntary motion undeceive him; the heart palpitates, and flutters, the voice changes, and deglutition is extremely difficult. Wild delirium ensues, the eyes sink, the features collapse and become deadly pale; and often, amidst the most distressing struggles, the patient expires.

Hydrocephalus, or Water in the Head.

In every period of the history of our profession, too little attention has been paid to the consequences of inflammation. Indeed I may say, it is only when these are about to terminate fatally that due attention is given to them; in other instances, they are almost completely neglected. Were they, however, to be made a subject of more general enquiry, medical science would be greatly benefited.

Among infants, hydrocephalus internus, or water in the head, is a very common disease; perhaps, however, not more so than formerly; for it only appears more frequent because we can now recognise and trace the symptoms from their origin, and our knowledge of its real nature is consequently more accurate than we could expect it to be in former times, when it could scarcely ever be said to exist till, when after death, the cranium was opened, and water was found within the ventricles of the brain.

The stout and healthy are more assailable by this disease than those of a more weakly habit of body, unless indeed the debility of exhaustion be extremely great.

The disease consists of two stages, the first, that of inflammation, the second, that of effusion, and it may consequently be classed as a disease of either of these kinds.

Writers on it have been in the habit of erroneously preferring to class it among dropsies; and, the remedies which such a state suggested always proving unsuccessful, it has long been deemed incurable.

In a periodical medical publication, I lately stated my opinion, that, in a practical point of view, it ought to be considered purely as an inflammatory disease; for though effusion of water into the ventricles of the brain be the sequel of this state, and be indeed that from which the disease derives its name, (a striking proof of the danger of incorrect names,) yet it is not to this state that the practitioner is to turn his attention; but solely to the preceding inflammatory one, and the disease may therefore be termed an inflammatory disease; that name alone indicating the remedies to be adopted. That, however, although chiefly considered as a dropsy, such remedies have been applied is unquestionable; but the fact that these remedies never were applied, either early enough or extensively enough, sufficiently proves, that the most correct notion of its nature was by no means entertained. Hence it was treated in the stage of effusion instead of that inflammation,—a stage in which all the remedies known to us are certainly vain *.

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* This is the amount of what I have to state respecting the *nature* of this disease, and I must therefore beg, that the quackish advertisements of the

Thus, the first principle adopted by authors respecting the nature of this disease being fundamentally wrong, all the reasonings which sprung from it have likewise been wrong; and, in this way, we may easily account for the uniform want of success which attended their practice.

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a modern author, well known for plagiarism, that the disease is perfectly remediable without any distinction of stages, may by no means, although founded on the presumption of the correctness of my doctrine respecting the disease, be imputed to me. As this person, by a publication on this subject, is likely again † to expose himself to the ridicule of every well informed reviewer, I must also beg that his trash may not be imputed to me, excepting in so far as he may adopt the principle I have here delivered, which is rather an attempt toward a different classification of the disease and the introduction of a more speedy and effectual practice, than toward any original discovery. It is deeply to be regretted, that the institution of a police for the purpose of preventing the world from being troubled with idle and mangled plagiarism is probably inconsistent with the general liberties of the subject.

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† See Crit. Review for March 1808; and Edinburgh Medical and Surgical Journal for July 1808.

It has long been asserted, and very generally believed, that this disease was sudden in its attack and *uniformly* fatal in its consequences.

The disease is never sudden in its attack, nor always fatal in its consequences; but I believe, that when effusion into the ventricles of the brain has taken place, the consequence must be fatal.

Its attacking infants in preference to adults, might be explained. We know that such is the particular state of the body in children, that the propelling and resisting powers have not acquired that degree of independence of each other, which they possess in after life, so that their diseases are totally different from those of adults; for, from this state of the body, any disease, wherever situated, will, either primarily or ultimately affect the most delicately organised and tender parts, in preference to any other.

Thus, by not understanding the real nature of this disease; and, like true medcial men, never at a loss for an explanation, we find that a variety of absurd names have been applied by practitioners to the different stages of it; such as the *spaining brash*, the *bowel hive*, *draughts*, *milk fever*, *convulsions*, &c.; and each of these have had their individual modes of treatment, which have been often hurtful, but seldom, if ever, beneficial. Syrups, small doses of opium, with a multitude of quack drugs, have occasionally been given for the removal of these complaints, and sometimes they have even ventured to apply a *small* blister between the shoulders, on the breast or the temples.

Some time ago, I visited a child along with a physician of this city, who has been long in practice, and who has been in the habit of seeing a very great number of the diseases of children. The child's pulse was 150 per minute, and strong; and I mentioned this circumstance to him; but, to my astonishment, he remarked, that he paid *no* attention to the pulses of children, as from them he never had been able to form any correct opinion respecting their complaints.

He believed, that the state of the pulse, in the present instance, was owing to a state of irritation produced by what he termed the *milk fever*, (the child had been weaned about a week before,) and for the removal of this he prescribed syrup of poppies. The symptoms were aggravated, the child shrieked incessantly, and, at the expiration of two days, the pulse was still full, and beat 170 per minute. The physician had not been very regular in his attendance, and I stated to the father my conjectures respecting the nature of the complaint, and advised a cap blister to be instantly applied over the whole head, and the bowels to be freely opened with purgative medicines. These means were applied, and in the course of the following day, the child ceased to scream, the pulse fell to 120, and, in one day more, it was only 100. At the pressing request of the mother, the blister was allowed to heal, and in the course of a few days, all the former symptoms recurred. The blister was again applied, and they were again relieved. For several weeks after, it was also found necessary to apply the blister several times, and, as the bowels remained torpid, they were opened by calomel and jallap. This case occurred more than a year ago, and the child is now perfectly well.

Lately I attended another case of the same kind in conjunction with the same physician. I advised a similar treatment; but it was not followed. He prescribed *Dalby's carminative!!!* with an advice to trust to the operation of nature. No blister was applied till the last day of the child's life, and nature had time to operate; for effusion had taken place, and the child soon died After death, I opened the head, in company with two medical gentlemen, and all my conjectures were verified; not only were the ventricles filled with water; but the whole brain was almost semi-transparent from the quantity of water which it contained.

In by far the greater proportion of cases of this disease, perhaps in ten out of twelve, the most acute inflammatory state of the system prevails for a longer or shorter time previous to the effusion of water into the ventricles, according to the peculiarity of constitution of the individual affected. The symptoms of this disease, as they most commonly occur, sometimes commence several weeks, but most commonly from ten to twenty days previous to the effusion of fluid in the ventricles. Even weeks before inflammatory action has been indicated by the pulse in those children who have afterward died of this disease, I have observed them suddenly cling their arms about their nurse, as if afraid of falling from her arms, and from time to time without any evident cause scream, as if suffering the most acute pain.

This disease may however be induced without any remarkable degree of previous inflammatory action. In extreme debility, particularly among children, the vessels of the brain, in common with those of the body in general, become greatly relaxed; and, in this state, effusion into the ventricles takes place. Under these circumstances, it may be difficult to ascertain the moment when the effusion does take place, as no remarkable phenomenon occurs by which we can be guided in our conjectures upon the subject.

In those, however, who die of this disease, from previous inflammatory action of the system, the time when the effusion of fluid into the ventricles of the brain takes place, may be more easily known. The quick, full, inflammatory pulse, which had existed for sometime previously, is suddenly diminished, both in its frequency and fullness, and every symptom of disease which before existed, seems entirely to abate; so much so, that I used to be at first deceived into the belief that the child was in a fair way of recovery. This state, however, seldom continues beyond a few hours, when the child is suddenly seized with convulsions and expires.

The effusion of water into the ventricles of the brain is therefore, considered in this practical point of view, only a consequence of the disease; it itself being purely inflammatory.

Dropsy is a preternatural accumulation of serum, in any part of the body. Dropsy.

During cold wet weather, it is more common than in summer. Persons of a sedentary life are more apt to be affected by this disease than those who take moderate exercise. Dram-drinkers in particular are most commonly at length affected with dropsy. In short, dropsy seldom, if ever happens, but in lax or reduced habits, from irregularity in living, too great use of spirituous liquors, from debilitating diseases, or from improper remedies used for their removal.

Affections of the heart, lungs, vena portarum of the liver, or indeed any cause obstructing the free passage of venous blood, such, for instance, as pressure on any considerable vein, will cause dropsy. Disease of glands too, through which lymphatic vessels pass, cause it and obstruction also to the free return of venous blood to the heart, by ligatures, &c in some habits causes dropsy.

All the species of dropsy, however, seem to depend on one general cause. The exhaling vessels, in health, constantly pour out a watery fluid which, without being allowed to accumulate, is absorbed by other vessels formed for that purpose; and it is a derangement in the action of one or both these kinds of vessels which causes this disease.

This is more commonly a symptom of some other complaint than an original disease.

Although, however, dropsy sometimes appears only in one form, it very frequently occurs in every form of the disease. The urine becoming less in quantity, is a symptom of this complaint. In it, indeed, the urine is always scanty, high coloured; and, when cool, deposits a reddish sediment.

If the diluent liquors taken in be greater than the evacuation by urine, the disease will most certainly increase.

Dropsical complaints are very apt to recur after their entire removal, which renders them in general dangerous diseases. And even although dropsy does not recur after its removal by medicines or otherwise, the patient is seldom afterwards in good health, owing to the vitiated state of the whole system.

Hydrothorax, or water in the chest, often takes place to a considerable degree before it can be discovered to exist. By moving the body backward and forward, however, we are in general able to ascertain its existence.

In this water, it is remarkable, that these animals called hydatids frequently exist.

Diseases of the lungs and heart are causes of hydrothorax. It comes on with a sense of anxiety about the lower part of the sternum, and this is followed by some difficulty in breathing in making an ascent, and while in bed.

In the commencement of the disease, the patient feels thirst, with a tickling dry cough, and is easily put out of breath on going up a hill. This frequent and dry cough, however, is soon accompanied with an expectoration of thin mucus. In this disease, too, the pulse is small and quick, and remarkably irregular, and the lips become livid. Persons also affected with advanced hydrothorax complain of coldness of the air when this is not felt by others, and they are often feverish. The patient in this disease, can lie easiest on the back. In some cases of it, however, the sleep is broken by difficult breathing, anxiety, and palpitation of the heart, which immediately requires an upright posture. Frightful dreams trouble the patient. The pulse often sinks so low as 24 or 28 beats in a minute; it is often irregular; the feet and legs often swell; the face is pale, sometimes almost livid, and when death is suddenly brought on, it becomes nearly black.

Before death, in this disease, a spitting of blood sometimes occurs; and the patient often dies when he lies down suddenly, or on turning quickly in bed, by the water suddenly compressing the lungs, and causing suffocation.

In ascites, or water in the belly, the swelling is often immense, and present to the hand a regular and smooth surface. This water is often in cysts, and then there is considerable inequality over the whole belly. When ascites is thus incysted, many of the most alarming and troublesome symptoms of dropsy are absent.

Striking the belly on one side, while we hold our other hand on the opposite side of the belly, is a good way to ascertain if water exists there, as, if it does exist, a tremulous effect is produced.

Ascites is often a consequence of diseased liver, or of an enlargement of the spleen or pancreas.

Though ascites is sometimes accompanied by fever, yet it is frequently absent. It has, however, been observed, that during ascites, the derangement in the general system is greater than in the other species of dropsy.

This disease sooner or latter occasions œdematous swellings of the lower extremities.

Dropsy is called anasarca when it exists in the cellular substance. This disease not being at all times attended by any other affection of the system, is therefore, in many instances, easily removed.

In anasarca, the under extremities are most apt to become w nderfully swelled, while the penis and scrotum becomes greatly distended. The legs in a depending posture generally swell at any time, but most particularly toward night, and this is often greatly removed before getting out of bed in the morning.

Compression of the vena cava by the pressure of the uterus during pregnancy, often causes swellings of the legs; but the cause being removed, and the constitution not being impaired by disease, they entirely abate. This likewise occurs in very old people, and during hot weather.

Pressure with the finger in anasarcous swellings leaves a hollow, which remains for sometime, even after the pressure is removed.

When little blisters, containing yellowish matter, appear on dropsical extremities, they show the disease to be in general of a bad kind, and form sores which are often very difficult to heal. When persons who have long complained of disorders of the lungs or bowels are affected with swellings of the legs, it usually constitutes one of the worst forms of dropsy of these parts; and when anasarca pervades the whole body, even to the head, we find the legs least swelled in the morning upon getting out of bed, and the head swelled in the greatest degree. This last, however, falls during the day as the other increases.

Leucorrhæa.

This disease is in general a consequence of previous inflammatory action. It is the most common disease with with which females are affected, and although not immediately fatal, often unperceivedly saps the constitution, and renders the body liable to the attack of numerous and destructive diseases.

It begins by a discharge *per vaginam;* pains in the back and loins, in the head, stomach, &c. with general lassitude and debility soon follow. Sleep also is disturbed by fearful dreams, and yields no refreshment. The patient at length looks pale and emaciated, her eyes are dull, and most distressing flushing of the face is alternated by the most ghastly paleness. At length, the feet and ancles swell. The mind becomes dejected, apprehensive, easily alarmed and occasionally affected with deep melancholy. She then becomes peevish, fretful, irascible and anxious, which tend only to increase the complaint. The functions of generation are at length almost destroyed, and it is a very common cause of sterility.

Hysteria also, in a greater or less degree, is almost always a concomitant of this affection. The urine is turbid, the menstrual discharge is sometimes scanty, or even suppressed; at other times it is too copious, irregular, discoloured and attended with most indescribable pain.

This disease is seldom, if ever, removed by nature, and, if artificial means are deferred, it sooner or latter proceeds to waste the constitution with accumulating mischief. Every symptom becomes aggravated to the utmost pitch. The eyelids and face swell, become bloated and disfigured; the body becomes astonishingly meagre and debilitated: hectic fever, then, with all its direful train, and dropsy in every form, supervene, and terminate the miserable scene *.

Fever and dysentery seem to arise either from the effluvia occasioned by derangements of soil, or by filthiness of manners.

Fever.

The ordinary state of the pulse in a healthy person ought to be from 73 to 76 beats in a minute. There are exceptions to this rule, but they are not common. It is therefore when the actions of the sanguiferous system are principally disturbed, and the temperature of the body subject to unnatural variations, that the disease is termed fever.

Febrile diseases are in general attended with cold shivering, succeeded by heat, increased frequency of pulse, and diminution of strength.

Fevers are of various kinds, and of various

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* For a more particular account of this disease, see my Practical Treatise on that subject.

degrees of severity, according to the country and circumstances which give rise to them, as well as the difference of constitution of those exposed to their influence. They are, however, probably much more nearly allied to each other, in some of their more important characters, than we are usually in the habit of believing.

Fevers are intermittent, remittent, or continued; as in the first a distinct intermission takes place between the paroxysms; in the second, no intermission, but an abatement in the paroxysms occurs; in the third, no well marked remission takes place.

In intermittent fever, the fit is either a quotidian, returning every day; or a tertian, returning every other day; and if there be the interval of two days between the fits, it is called a quartan. Much longer intervals have been known; but these happen seldom, and have been distinguished by no name.

As the fevers in cities or towns, or where the atmospheric air is impregnated with noxious effluvia, are, in general, of the continued kind, or those known under the term of typhus or synochus, it is to the consideration of these that I shall now confine myself.

There are several varieties of continued fever, but as it would be foreign to my purpose to enter into a minute detail of these, I may merely refer the reader to Dr Wilson's work on the subject of fevers, where ample information will be found. As, however, this fever is by far the most common, and is at all times caused by local circumstances, I shall very rapidly run over a few particulars respecting it.

Continued fever is greatly influenced by the season and local situation in which it appears, but is always dangerous, and of a contagious nature.

Those fevers termed continued, have pretty constantly an indistinct exacerbation and remission. The cold and hot stages regularly succeeding each other, particularly in the commencement, and the absence of the sweating stage denote the nature of this fever. The pulse also, is generally less frequent at the commencement of continued, than at that of intermitting fever.

In the cold stage, there is languor, weariness, soreness of the flesh and bones, and headach often to a very considerable degree. The pulse is small and frequent, the strength greatly reduced, and the bowels are constipated. The cold stage is at length less conspicuous, the hot becomes more permanent; and although when this alteration takes place, it is partial, it soon becomes more general, and the chills are sometimes for several days less distinctly marked than at its commencement: the strength and fulness of the pulse increase; but, in general, this does not happen in a very remarkable degree, although, in some instances, the pulse acquires considerable strength, particularly in the commencement of the disease. Thus the hot stage at length becomes the most distinct, suffering more or less evident remissions once or twice a-day for weeks, or even months.

If, after these remissions, however indistinct, the symptoms return with increased violence, the danger is greater than when the violence of the symptoms, after these remissions, abate; or even continue unabated for weeks or months, provided the patient's strength does not suffer much. In the last instance the fever is said to have taken a turn, and the prognosis is favourable.

In this fever, the sense of hearing is often morbidly acute, causing the utmost distress to the patient on the slightest noise.

Persons seldom die of fever after the 20th day, unless it be joined with some other disease. When petechiæ change their colour from dark to a more light, it is a favourable symptom. These are of different sizes and clours, but in general small. They are black, brown, or whitish. The black are the most dangerous, the brown next, and the whitish, or rather yellowish, least; but all of them during fevers are to be considered as dangerous indications.

A great flow of urine is in general a favourable symptom, but if it be very pale in fevers, unless the patient has drunk much small liquor, it is much worse than when it deposits a sediment, which shows that the distemper is beginning to abate. Viscid and partial sweats, too, in typhus, are always dangerous.

Delirium, throbbing of the temporal and carotid arteries, anxiety, laborious breathing, pain in the abdomen, difficult deglutition, cadaverous smell of the body, petechiæ, fœtid breath, and shrunk cold extremities, are all unfavourable symptoms.

Irregular hard pulse, delirium, flushed face, with redness of the eyes, watchfulness, with almost continual sleep, or this approaching to coma, great change of voice, dry hard tongue, hiccough, picking the bed-clothes, as if observing spots on them, retention of urine and black purging, are very bad symptoms.

When double vision takes place, when the eyes become fixed, dim, and ghastly, when deglutition fails, so that the patient is unable to put out his tongue, when rattling in the throat begins, and blue and green spots (worse than petechiæ) appear on the body, we may consider all hope of recovery at an end.

A curious fact too, occurs to my recollection of the effects of climate on our common typhus.—A frigate sailed from Portsmouth for the West Indies; and soon after it sailed, several of the crew were taken ill with typhus fever. As they advanced into the warm climate, all the symptoms were aggravated, the skin became yellow; but still the typhoid symptoms continued, and when they arrived, those thus affected distinctly possessed the peculiar disease of the country.

Jail Fever.

When a person is seized by any feverish complaint, such as a simple remittent or cold, and neglects cleanliness, is despondent, and has no supplies of fresh air, a virulent degree of infection is often produced. If confined to the murky air of a jail, hospital, or ship, the most malignant fever will be occasioned; and if to a crowded apartment, as happens in the families of the poor, a contagious fever will be generated, differing only from the jail, hospital, or ship fever, in degree.

The hospital and jail-fevers are to be considered as the same disease, and little, if at all, differing from such as have arisen after battles, when the bodies of the slain have been left unburied to rot upon the field.

This fever is commonly preceded by a disagreeable lassitude, till acute pains of the head and back, great oppression and anxiety on the breast, irregular shivering fits, frequently a foul, furred, bilious tongue, and often a bad taste in the mouth come on; a quick pulse is found in many; whilst in others, it is small and quick, or tremulous. Small interchanges of heat and cold, are perceptible, also trembling of the hand, numbness of the arms, weakness of the limbs, and loss of appetite. On the second or third day, the tongue becomes black and parched, and the sick have little or no thirst; nor do they make any complaint, but of want of sleep, which yet they seem too much inclined to.

About this time, stupor, a leading criterion in the fever, universally comes on; the pulse, which at first is often full, now sinks; and they have little or no extraordinary heat of skin, in general. Some, about the third or fourth day, talk incoherently; but this soon changes into an insensible stupor, and in a little time come on cold and clammy sweats. In many, on the second or third day, dusky or florid specks, like flea-bites, appear all over the body, or neck, breast and arms; and whenever they appear, the pulse sinks wonderfully; sometimes little red lines also run out, diverging from the petechiæ, and extending frequently a good way on the surface of the skin. The eyes seem much affected from the beginning; but the same patient, who looks with a wild stare on the first days of the distemper, soon sinks into that of stupor, with a shining gloss on the white of the eye and cartilaginous part of the eye-lids. They continue thus almost senseless many days, and are uncommonly oppressed, before the crisis, with much sighing and anxiety across the chest. The pulse, after the fifth or sixth day, is so exceedingly hurried, as scarcely to be numbered; and, for some days before death, an offensive cadaverous stench issues from the body.

One of the most unfavourable circumstances attending this fever is, the proneness to a relapse, the danger of which is greatest during the hot weather, less, in the decline of autumn, and least of all after the frost begins.

Dysentery. Dysentery is, perhaps, one of the most distressing complaints in hot climates; and, it has been observed, that such seasons as produce most flies, caterpillars, and other insects, whose increase depends so much on heat and moisture, and consequently on corruption, have likewise been most productive of the dysentery.

It is much more frequent in warm than in cold climates; and is most common in summer or in autumn.

A specific contagion is always to be considered as the remote cause of this complaint. Irregularity in living, however, in those countries where dysentery is common, is very apt to induce it; and soldiers lying on cold damp grounds in crowded camps, and the passengers in slave ships, &c. are very liable to be affected by it.

It is sometimes preceded by slight diarrhœa, and there is then an unusual flatulence in the bowels.

In general, the contagion is not suddenly diffused. For, whole towns and camps are never seized at once, in consequence of the impurity of the atmosphere; but the infection is carried from one to another, by the effluvia, or clothes, bedding, &c. of the tainted person; as is the case with the plague, small pox, and measles.

This disease is not so infectious as most other contagious diseases; but it always is so, in a certain degree, particularly in military hospitals, and in the houses of the poor who want the means of cleanliness.

The putrid effluvia of the dysenteric fæces not only produce a similar disease; but are apt to propagate the common bloody flux, and likewise to breed the malignant hospital fever, with or without bloody stools.

The symptoms of dysentery, are frequent want of going to stool with excessive pain, from which, by passing a small quantity of mucus tinged with blood, or even blood itself, no relief is obtained; fever of an inflammatory kind, is more or less constant during the disease; a pain just under the navel, with nausea, vomiting, fever, loss of appetite, sleep, and strength. When at stool, there is most violent and distressing strainng. The stools are not, however, at all times of mucus: they are of various consistence, mostly hard, and in separate balls; at times mixed with membraneous films, and at all times unusually fætid. When a free evacuation is procured, the pains and tenesmus abate in their violence.

During this disease, it is extremely probable, from the appearance of the evacuated matter, that the intestines are less or more in a constricted state. There is seldom any evacuation of natural fæces; but, when they do appear, they are generally in a compact and hardened form.

Inflammation, and even ulceration of the bowels have been known to accompany this disease, and the patients sometimes become hectic and dropsical. We must not, however, mistake, for dropsy, the very great distention of the bowels with air which, in this disease, is often present.

The disease often terminates fatally in a few days; at other times, if the fever be not violent, it is protracted for several weeks or even months, when still it may terminate suddenly, but the chances of escape are then more to be depended on.

When the disease terminates fatally, there is often present a great tendency to a putrid or gangrenous state. The patient will often, however, linger under the disease for months, when he may be affected by inflammation of the bowels.

We have now to consider some of the most important of those diseases which arise, not from natural, but from artificial causes; namely, depraved modes of living, &c. These diseases are of the liver, stomach, and bowels.

Liver Complaints.

The most common, but least dangerous complaints of the liver, arise from stones obstructing the gall ducts. When this, however, continues for some length of time, it is attended with pain at stomach, jaundice, or yellowness of the skin, sickness, vomiting, languor, inactivity, sleeplessness; and, lastly, wasting of the flesh.

Affections of the stomach precede diseases of the liver, caused by the abuse of spirituous liquors even in a diluted state. Their excess, however, hurts the liver more than the stomach, to which they are immediately applied, or indeed more than any other of the abdominal viscera. A sedentary life, also, with grief and anxiety, weakens the powers of the stomach, which ultimately affects the liver.

Inflammation of the liver may be acute or it may be chronic. The acute affects the membrane; the chronic, the substance of the viscus. It is to the last of these that the liver is most subject.

Chronic inflammation of the liver, though not at first alarming, is attended with difficult breathing on making any exertion, flatulence, indigestion, acidity, and costiveness; the flesh and strength are gradually wasted, and the complexion becomes bloated or pale and sallow.

This inflammation of the liver is often mistaken for a dyspeptic state of the stomach.

Acute hepatitis is particularly incident to the East Indies, and very commonly terminates in suppuration. When, however, that has been checked, it becomes chronic, with schirrous indurations.

This disease may be caused by falls, blows, by cold applied to the body, or by passions of the mind; it may exist with, or be produced by, other diseases.

The symptoms of acute hepatitis are pain in the right side, often extending to the shoulder, slight cough, fever with a hard strong pulse, high-coloured urine; hickuping and vomiting often attend it; and when the disease is very severe, the patient can only lie on the affected side.

In this disease, pain in the region of the liver is very acute, attended with difficult and painful respiration, great watchfulness and occassional delirium. The tongue is covered with a white crust, and the mouth and *fauces* are extremely dry. The urine also is secreted in small quantity, high-coloured, and frequently tinged with bile.

If for a few days the fever and pain increase, suppuration is the consequence; during this, frequent rigours are felt, and a sense of weight succeeds that of acute pain.

If the inflammation be violent, and active means delayed, suppuration will also be the consequence, and if the inflammation be moderate, it will degenerate into schirrus. Sometimes, however, the pain subsides suddenly, the pulse flutters, the extremities become cold, and deliquium and death ensue.

If the external or convex part of the liver be affected in this disease, a tumour may, though not always, be observed, and pressure occasions pain; if the inner or concave be affected, there is difficult and painful respiration, dry and frequent cough, and shooting pains extending toward the shoulder.

Like other inflammations, this may terminate by resolution, suppuration, or by gangrene.

The symptoms of suppuration are a diminution of pain, sense of pulsation, weight in the region of the liver, frequent returning rigours, fever towards evening, flushings of the countenance, a propensity to profuse sweating, and other symptoms of hectic fever.

The period of suppuration is influenced by the degree of inflammation, the climate, season of the year, or the remedies that have been employed.

If the discharge, in consequence of suppuration, be through the diaphragm into the thorax, or directly into the abdomen, the disease frequently proves fatal. When evacuation of matter by the intestines takes place, it is conveyed to them by the hepatic duct, or more frequently at the part of the intestines where adhesion has been formed with the liver, and ulceration has followed. In some, a great abscess of the liver preternaturally makes its way into the stomach or bowels; immediately the patient voids, by vomiting or purging, most offensive matter, and dies in a few hours.

Schirrous may exist in the liver without previous active inflammation, as in those who have long resided in warm climates. By this indeed schirrosity of the liver is most generally caused, and by the abuse of ardent spirits.

The progress of schirrus in the liver, is probably similar to the same disease in the breasts of women. Inflammation in it occasionally increases and abates, the intervals between such attacks at last became shorter, the appetite and strength fail, and the flesh wastes by degrees; there is some cough, hiccup, and at length dropsy.

The very worst cases of liver complaints may proceed through their whole course without jaundice being caused by them.

Stomach Complaints.

Perhaps there are no complaints to which the human frame is liable, in which such completely unfeigned misery is experienced, as in some states of diseased or of depraved digestion.

Stomach complaints may sometimes exist in consequence of loss of tone in its muscular fibres. The habits which cause a loss of tone in the stomach, are frequent drinking of warm watery liquids, surfeits, frequent vomiting, &c. Schirrus in the pyloric orifice or outlet of the stomach, is generally caused by abuse of ardent spirits; and there are numerous glands at this part which, from these practices, are very apt, in certain persons, to become affected. It produces the highest acidity in the stomach. Regurgitation of bile also into the stomach produces languor of body, nausea, foul tongue, and indigestion; or, being directed to the intestines, produces a painful diarrhœa. Those pursuits too of any description which irritate and distress the mind, invariably cause a derangement in the digestive organs.

Many, perhaps most of the diseases of the digestive organs, caused by various circumstances, consist in a weakness and irritability of the affected parts, accompanied by a deficiency or depravity of these parts, or by a deficiency or depravity of the fluids secreted by them, and upon the healthy qualities of which the right performance of the functions depend.

If the tongue be furred at its back part in the morning, when there is no fever, and when the patient has taken no stimulating or indigestible food on the preceding night, it is reasonable to infer in general, that the state of the tongue is owing to its participating in that of the stomach. The state of the tongue is, in general, an infallible criterion of a disordered condition of that organ, but it does not point out the kind and degree of that disorder. With the furred tongue, a disagreeable taste is felt in the morning, and the breath, in most instances, independently of the greatest care that can be taken, acquires a most disagreeable smell. Sometimes the cuticle of the tongue seems to have lost its usual colour, and to become permanently white, in consequence of continued disease.

In some states of depraved digestion, there is almost a complete disrelish for food, yet the appetite is not impaired, as, at the stated periods of eating, the patient can, though without much gratification to himself, eat heartily. Appetite is therefore sometimes moderately good when digestion is imperfect; and the latter may not be deficient, although the disease may exist. In some instances, indeed, the appetite is inordinate.

With hard drinkers, however, sickness and vomiting frequently occur in the morning. The loathing of food at breakfast, when the stomach ought to be most vigorous, is a leading symptom of a weak stomach, and disordered constitution.

In some ruined constitutions, there is an almost perpetual feverishness and thirst, with loss of appetite and strength, and shortness of breath.

With vertigo, arising from the stomach, there is depraved appetite, indigestion, flatulence, pain and weight in the stomach, sickness, vomiting, costiveness and worms.

That which is pretty generally known under the name of the water brash, which is an occasional involuntary discharge of clear fluid from the mouth, is in consequence of a most distressing state of the stomach.

In stomach complaints, there is also often pain in the eye-balls, giddiness and sounding in the ears. The mind likewise of those affected with stomach complaints, is frequently irritable and despondent; and anxiety and langour are expressed in the countenance. The pulse is frequent and feeble, and slight exercise produces considerable perspiration and fatigue. They are restless at night, and their sleep is not refreshing; they are also affected with lassitude, are easily alarmed, and feel as if incapable of moving in bed,—an affection known by the name of the night-mare. The stomach often becomes so diseased, that the patient's terror, he knows not for what, is indescribable. Neither amusement, society, nor the soothing voice of friendship, can alleviate his distresses: he knows no comfort during the day, and sleep, undisturbed by the utmost horror, seldom refreshes him; he is a burden to himself, and to all those who take an interest in his welfare.

Though Dyspepsia and Hypochondriasis are neither of them dangerous, they often induce other diseases which prove dangerous. A stomach vitiated by bad habits, is with difficulty reformed, but may ultimately be reconciled to simple and healthy aliment. And wretched, indeed, is that state of existence where the natural powers have lost their vigour, and where artificial means alone can be depended on to procure temporary relief; where the feverish and precarious existence is alone preserved and rendered bearable by the very means which must soon wear it out.

Bowel Complaints.

There can be no doubt that diseases of the stomach affect the intestinal canal; otherwise in a healthy state, and that diseases of the small intestines extend their influence to the stomach.

When digestion is imperfectly executed, the functions of the intestinal canal must soon participate in the disorder of the stomach. For if undigested matter pass from the stomach into the intestines, it cannot be supposed that its powers are capable of converting it into the chyle, or milky fluid, which is separated from the digested food to be added to the blood.

'It will, I think, be generally granted, that the state of the excretions from the bowels commonly indicates the healthy or disordered state of those organs.

Diarrhæa in general is a mild, simple disease, often caused by some irritating or offensive substance taken into the stomach, and when it is expelled by the disease which it induced, or otherwise, the patient recovers.

When the bowels have become much disordered from irregularity in living, or other causes, grating or sometimes sharp pains are felt in them, with a constant but very partial desire to evacuate them; and there is, at the same time, some difficulty in passing water. From time to time, too, the belly swells, occasioning indescribable uneasiness, particularly while in bed, and, in this state, they often continue for several years.

Various acute, or otherwise distressing pains may exist in the bowels from different causes. There is often a languidness in their performing the functions of assimilation and expulsion, which is productive of sickness, vomiting, tenesmus, flatulence, a sense of fullness and tension of the belly, borborigmi, pains like cramp, difficulty in passing water, with acid eructations, At other times, the ovaries, womb, bladder, kidneys, spleen, pancreas, liver, omentum, &c. stones in the gall-bladder, schirrous tumours and ulcers in the abdomen, worms, ruptures, colica pictonum, ileus, and malconformations, occasion pains of various kinds.

With respect to worms, those I propose to take notice of here, being most common, are the round worm, very much resembling the earth worm in appearance, and the very small one called ascarides, which is pointed at one end and round at the other.

The round worm is chiefly to be found in the small intestine, though sometimes in the stomach, and the most common situation for the small worm, or ascarides, is in the rectum. The round worms are even sometimes voided alive by the mouth. They are more apt to produce affection of the general system than ascarides.

Various symptoms accompany worms in the intestines, and these animals, of various kinds, have often been known to exist there without occasioning any troublesome symptom at all.

Although all the following symptoms seldom if ever appear in one person affected with worms, they are found more or less to prevail. A swollen upper lip, itching of the nostrils, grinding of the teeth, giddiness, pain in the head, with languid eyes seldom entirely shut while asleep, dilatation of the pupils, sleep restless, from which the patient wakes in a fright; slight convulsions, feverishness, thirst, with frequent discharges of water from the mouth, frequent changes of colour, with cold sweats, depraved taste, offensive breath, dry tickling cough, shortness of breath, corroded gums, hiccup, itching at the nose and fundament, oppression at the stomach, and irregularity and pain in the bowels; sickness, milky urine, fainting or trembling, unequal desire for food, sometimes a most voracious appetite, sadness, with debility and wasting of the flesh, and at length a horrid appearance of the countenance, the belly becoming large and hard, and the limbs thin and soft.

The existence of worms in the intestines has often been mistaken for hydrocephelus internus, or water in the head.

An account of many other universally prevailing diseases might have been inserted here; but this, in such a work, was inadmissible.

END OF VOLUME FIRST.

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